TRANSACTIONS

OF THE

NORTH CAROLINA

STATE AGRICULTURAL SOCIETY

FOR

1857

WITH THE

CONSTITUTION AND BY-LAWS OF THE SOCIETY

ACT OF INCORPORATION

&C &C

RALEIGH:

HOLDEN & WILSON, "STANDARD" OFFICE

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MINUTES

OF THE

ANNUAL MEETING

OF THE

NORTH-CAROLINA STATE AGRICULTURAL SOCIETY.

1857.

RALEIGH, Oct. 19th, 1857.—7½, P. M.

The Society met, the President, Hon. Thomas Ruffin, in the chair.

The President stated that it was usual to hold an informal meeting on Monday evening of Fair week, to ascertain how many of those who had been appointed Judges to award premiums were present.

The Secretary then called the names of the Judges, and took a note of those who were present, upon which it appeared that a much larger number of the Judges was present than is usual.

An opportunity having been afforded to those who wished to enroll their names as members of the Society, several appeared and availed themselves of the opportunity, after which the Society adjourned, to meet to-morrow evening at 7½ o'clock.

W. D. COOKE, *Secretary, Pro Tem.*

RALEIGH, Oct. 20th, 1857.—7½, P. M.

The Society met at the appointed hour, the President in the chair.

On motion of R. H. Smith, Esq., of Halifax, the names of the Judges to award premiums were called over, to enable the Executive Committee to complete the list.

At the request of the President, the Secretary of the Executive Committee explained the mode in which the Judges were to discharge their duties, &c., on Wednesday.

The President presented to the Society the following communication from the Granville County Agricultural Society.*

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* The acting Secretary, Mr. Cooke, reports this letter lost, it cannot therefore be inserted here.—J. H. BRYAN, Jr., Sec.

The President also stated that Messrs. Vaughan, Gibson and Wren were present as delegates from the Virginia State Agricultural Society, whereupon the Secretary of the Executive Committee presented to them, and to the delegates from the Granville County Agricultural Society, complimentary tickets to the Exhibition.

The President stated that Mr. Jno. C. Partridge, who was elected Secretary of the Society at the last annual meeting, and subsequently elected Secretary of the Executive Committee, having resigned both offices, on account of his removal from the State, Mr. Wm. D. Cooke had been elected Secretary of the Executive Committee, and had, by request, acted as Secretary of the Society until the election of a Secretary by the Society. He also stated that the minutes of the Executive Committee were open to the inspection of the members.

Gov. Manly said that he desired to hear an Agricultural Speech, and as he had a distinguished friend present who expected to leave the city tomorrow, who was well acquainted with the history of the chinch-bug, the culture and utility of the Oregon Pea, &c., he desired to hear from him on this occasion. He referred to the Hon. A. W. Venable, of Granville.

The President remarked that he knew Mr. Venable was always ready.

Mr. Venable arose and said, that while the call upon him was entirely unexpected, and that while the President attributed to him a greater readiness for public speaking than he possessed, yet he must be an indifferent farmer who could not talk about farming. As to the chinch-bug of which his friend Gov. Manly had desired information, he remarked that there were two things he disliked more than everything else, viz: the chinch-bug and wild onions. While he hoped that some providential means might destroy the chinch-bug, he did not think that Providence would ever remove the onions—at least it had never made any effort to do so yet. He said that the ravages of the bug were very severely felt in Granville last year, but the cold spell in April had saved the farmers of that county the present year, as it killed the bug. He then proceeded to give a very interesting history of the chinch-bug and the effect of the weather upon them. He remarked that they were most destructive about three weeks from the time they deposited their eggs. He thought the most effective remedy against their ravages was to sow early wheat having hard straw, as the delicate straw was soon prostrated by them. He regarded wet weather as the most desirable to prevent their ravages, as they were very injurious in dry weather. Mr. Venable then proceeded to give a very interesting account of the growth of corn, the effect of plowing too close to the roots, the manner in which the bug attacks the roots of corn, &c. He said that persons who plowed too close to the stalk broke up the brace roots, and while the stalk might have a vigorous growth and attain a large size, the corn would be found small and deficient. He thought that plowing too close to the stalk was very injurious to the corn. In referring again to the chinch-bug he said that there was one thing that would destroy them, and that was a win-

ter which was alternately very cold and warm, and wet. He said that the bugs lived in winter in old trees, leaves, and such places.

In regard to the Oregon Pea, he said that if it were sown the last of May or the 1st of June, it would make a good fallow for wheat, but it must be sown thick. The Oregon Pea made very good hay for horses and cattle, but he regarded the Shinny Pea or Black Pea as more desirable than the former.

Mr. Venable then alluded to the use of Guano. He said that he was one of the first to use it in Granville, and had applied it in every way. He would take occasion to remark, however, that guano at $60 per ton don't pay at the present prices of wheat. He did not think the present market prices any test, however, but he did not believe that wheat would be higher than $1.35 or $1.45 the present season, and at those prices the farmer could not afford to pay $60 per ton for guano. He said that guano was a most excellent fertilizer, a good improver, but it was necessary to use straw or leaves, or something of the kind in connection with it, as it was of no use by itself. Guano was only an element of fertility, and it was as necessary to use straw or something of the sort with it, as yeast was necessary in making good bread.

Mr. Venable then referred in eloquent terms to the financial distress which now so severely affects the whole country, and said that while the Free Love, Abolition north was shivering and tottering by the present financial revulsion, King Cotton and Tobacco sustained the South and made her independent. He referred to the large grants of land made by Congress to the North-western States, and said that there was a perfect net-work of railroads made in those States by the millions of acres of land granted by Congress to them. He thought southern men ought not to send their capital north while the north was doing all it could to embarrass us by keeping up the prices of sugar and other necessaries of life. He said that northern men had been caught in their own traps, however. That while they had been buying and storing immense quantities of sugar, southern people had been economising and using less. He had not used as much sugar in his family this year by 300 lbs. as he had used last year. He referred to the fact, published sometime since, that at one time there were in Boston 20 acres of sugar, and rejoiced that an immense crop the present year was bringing down the prices, and thus ruining those northern houses who had such quantities stored away in order to keep up prices. Mr. V. said the way the crisis was brought about was by the wild speculations in western lands, and that in these speculations the southern men were the only persons who lose any money, as the northern speculators buy without money, and sell to the southern men for cash. He said that the only way for good times to be brought again, was for the planters to save all they could and go to hard work. In this connection he deprecated the practice of some planters in leaving every thing in the hands of their overseers. Does a merchant, he asked, leave every thing in the hands of his clerk, without requir-

ing a statement of his sales, &c.? He said that the planters must bring up their sons as farmers.

In conclusion, Mr. Venable expressed his regret that our State Fair was made to conflict with the Fair of the Union Agricultural Society in Petersburg, and suggested that our Fair be held a week sooner hereafter. He deprecated any rivalry between us and Petersburg. Petersburg is our market, and is sustained by North-Carolina, and we should endeavor not to have our interests to conflict with each other. He said that it formerly took one-half a man could raise to carry the other half to market; but now we had Railroads in every part of the State, and a brighter day has dawned upon us. Then, the State was out of debt and the people in debt. Now, the people were out and the State in. He thought it better for the State to be in debt and the people out, than for the people to be in and the State out.

Finally, he thought that when we meet together we ought to tell and profit by each other's experience.

Gov. Manly returned his thanks and those of the Society to Mr. Venable for his interesting speech.

Mr. Burgwyn, of Halifax, requested Mr. Smith, of Halifax, to give the Society some information in regard to the cultivation, &c., of the Chinese Sugar Cane.

Mr. Smith arose, and after a few preliminary remarks stated that he planted his cane in rows, 3 feet apart, leaving 3 or 4 stalks in a hill. About the 1st of September the cane was stripped of the fodder and the seed gathered, and then the juice expressed by means of a rude mill which did not get much more than half of the juice it contained. The juice thus expressed he boiled with lime water in order to clarify it. He said that 168 gallons of the juice was expressed from about an acre of stalks. If a good mill had been used he thought 250 or 300 gallons might have been got from the same stalks. It produced over 25 bushels of seed to the acre. He thought that a larger quantity of fodder might be made from a certain number of stalks of Indian corn than the Sugar Cane would produce. Mr. Smith stated that 8 gallons of the juice, he thought, was sufficient to make a gallon of good syrup. He stated that it was a most excellent food for hogs, and that they ate it with greater avidity than Indian corn. He thinks it will become very profitable.

Mr. Burgwyn said that he thought the Sugar Cane would be more valuable as fodder than for any other purpose. His idea is to sow the seed thick, and when the cane is about a knee high to cut it down with a reaper. When dry it was better for horses, &c., than oats.

A member asked the President for information as to the cost of raising the cane.

Judge Ruffin stated that he could not give any information of his own experience as to the cost, as he had not attempted to express the juice of the cane. But he wished to say that he had tried the cane upon hogs,

cattle, &c., and found that it made most excellent food for them. It caused hogs to grow very rapidly, but did not fatten them. It caused cows to give milk very freely.

Mr. Venable stated that the cane would be found valuable as a preventive of typhoid fever among negroes. A physician had assured him that where negroes used much molasses they were never subject to typhoid fever.

At 10 o'clock the meeting adjourned to meet to-morrow evening at 7½ o'clock.

W. D. COOKE, *Secretary, Pro. Tem.*

RALEIGH, Oct. 21st, 1857.

The Society met at 7½ o'clock, p. m., the President in the Chair.

On motion of Mr. Rayner, of Hertford, an opportunity was offered to persons who wished to become members of the Society to have their names entered.

The President explained that there were two kinds of membership in the Society; any person by paying an annual fee of $2 may become a member of the Society, and the payment of $20 at one time constitutes the person a life member, and he is relieved from the payment of the annual fee of $2.

The fund arising from life memberships constitutes a permanent fund for the endowment of the Society, the interest only being used.

Mr. Wren, one of the delegation from the Virginia State Agricultural Society, arose and asked the President if it was consistent with the rules of this organization for a Virginian to become a life member, and upon being answered in the affirmative, requested that his name might be put down as a life member.

The President made his son a life member.

One or two gentlemen offered to be one of 50 or 100 men to subscribe $50 each for the aid of the Society.

A member stated that the Maryland State Society experienced the same difficulty in raising money to sustain them as is now experienced by this Association, and that it was only relieved by the city of Baltimore subscribing $10,000. He stated that the Legislature of South-Carolina gave annually to their State Society $5,000 to enable them to defray expenses, and he thought our Legislature ought to do likewise towards this Society.

Messrs. J. L. and R. R. Bridgers, J. S. Dancy, B. E. Barron, J. J. Battle, and H. T. Clarke, of Edgecombe, requested that their names might be put down for $50 each, regardless of the action of other members.

Judge Ruffin, and Messrs. Jones and Long, of Caswell, Gen. J. T. Littlejohn, of Franklin, and Mr. Watson, of Johnston, also subscribed $50 each.

Mr. Burgwyn thought that if the Society raised too much money among its members, it would operate against their appeal for Legislative aid.

Judge Ruffin thought that if the Legislature saw the members of the Society struggling earnestly to help themselves, it would have a contrary effect to that apprehended by Mr. Burgwyn. He alluded to the fact, that the Virginia Agricultural Society had a permanent endowment fund of $50,000, and said that this Society should have a permanent fund also. That the liberality of the members of the Virginia Society had placed it in an independent position; but we must have Legislative aid, if we expected to continue these exhibitions, as it was necessary to offer larger premiums to attract things from all parts of the State.

The discussion was continued for some time by Messrs. Kenneth Rayner, R. R. Bridgers, and Dr. Wm. R. Holt, and others.

Mr. Richard H. Smith subscribed $50, and Dr. Wm. R. Holt, of Davidson, entered his two sons as life members. Messrs. Gibson and Vaughan, of the Virginia delegation, also became life members.

On motion of Mr. Smith, the Society proceeded to the election of officers for the ensuing year:

Judge Ruffin arose, and after remarking that he had declined re-election to the presidency for the last two meetings, said that he would decline once more, and he hoped to be permitted to retire from the position.

Gov. Manly bore testimony to the efficiency and ability of the present incumbent of the Presidency, and thought his loss to the Society at this time would be more severely felt than the want of money. After saying many more complimentary things of the President, he concluded by expressing the hope that Judge Ruffin would re-consider his determination, provided he should be re-elected by acclamation, and forthwith proceeded to put the vote, when one unanimous "aye" assured the Judge that the members appreciated him too highly to hear to his declining the Presidency.

Judge Ruffin arose and said that he could not express his emotion and gratitude for such evidence of the confidence reposed in him, and while he would consent to serve the ensuing year, he wished it distinctly understood that he declined serving any longer.

The Society then proceeded to the election of Vice Presidents, which resulted in the unanimous election of Richard H. Smith, Esq., of Halifax, as 1st Vice President; Jno. S. Dancy, Esq., of Edgecombe, 2d Vice President; Dr. Wm. R. Holt, of Davidson, 3d Vice President; and Hon. Wm. A. Graham, of Orange, 4th Vice President.

The Society then proceeded to the election of a Secretary.

Major Wm. A. Eaton, of Granville, nominated W. D. Cooke, the present Secretary of the Executive Committee, and Mr. H. C. Jones nominated Jno. Spelman.

Mr. Burgwyn, of Halifax, asked the President if the election of Mr. Cooke to the office of Secretary of the Society would deprive the Executive Committee of his services as their Secretary, who replied that Mr. Cooke was really the Secretary of the Executive Committee, but was now acting as Secretary of the Society also; that the salary of the Secretary of the

Society was $100, and the salary of the Secretary of the Executive Committee was $300; he having all the labor of preparing the premium list for the Executive Committee and the arrangement for the annual Fairs.

The election resulted in the election of W. D. Cooke to the office of Secretary.

The Society then proceeded to the election of a Treasurer, which resulted in the election of J. F. Hutchins, Esq.

The Society then adjourned to meet to-morrow night at 7½ o'clock.

W. D. COOKE, *Secretary.*

RALEIGH, Oct. 22d, 1857.

The Society met according to adjournment, the President in the chair.

The President announced the following appointments, viz:

Executive Committee.

JNO. S. DANCY, of Edgecombe,
RICH'D H. SMITH, of Halifax,
WELDON N. EDWARDS, of Warren,
WM. A. EATON, of Granville,
CHARLES L. HINTON, of Wake,
WM. R. POOL, of Wake,
WM. H. JONES, of Wake,
Dr. WM. R. HOLT, of Davidson,
PAUL C. CAMERON, of Orange,
WILSON W. WHITAKER, of Wake.

Committee to Select an Orator.

HENRY K. BURGWYN, of Northampton,
RICHARD H. SMITH, of Halifax,
JOHN S. DANCY, of Edgecombe.

Marshals.

Col. E. P. JONES, of Caswell, *Chief Marshal.*
SIMON G. HAYES, of Granville,
Dr. S. WILLIAMS, of Granville,
HENRY A. DOWD, of———
WM. F. BRODNAX of———
GEORGE W. WATSON, of ——— } *Assistant Marshals.*

K. Rayner, Esq., of Hertford, offered the following resolutions, which were unanimously adopted:

Resolved, That the thanks of this Society are due, and are hereby tendered to John L. Bridgers, Esq., for the able, interesting and eminently practical Address delivered by him on the Fair Grounds this day; and that he be requested to furnish to the Secretary of the Society a copy of the same for publication.

Resolved, That 1,000 copies of said Address be printed in pamphlet form, and that

the Secretary of the Society be directed to send one copy to each member of the Society.

Jno. S. Dancy, Esq., of Edgecombe, offered the following resolution, which was unanimously adopted, viz:

Resolved, That the President be authorized to appoint four delegates to attend the National Pomological Convention, to be held in the city of New York, in the month of September, 1858, and that they be requested to make a report to this Society.

The President appointed as this Committe,

Mr. S. W. Westbrook, of Guilford,
Mr. Joshua Lindley, of ————
Mr. George W. Johnson, of ————
Mr. Moses Evans, of ————

H. K. Burgwyn, of Northampton, offered the following resolution, which was unanimously adopted, viz:

Resolved, That five members of the Society be selected, by the President, whose duty it shall be to make practical experiments during the coming year, upon the cultivation, production and uses of the Chinese Sugar Cane, and also of the African Sugar Cane, if to be procured, and report the result of their experience to the Society at the next Annual Fair.

The President appointed the following gentlemen on this Committee:

Mr. H. K. Burgwyn, of Northampton,
Mr. R. H. Smith, of Halifax,
Mr. Jno. L. Bridgers, of Edgecombe,
Dr. Wm. R. Holt, of Davidson,
Dr. James M. Johnson, of ———

The President read the following communication from the Secretary of the Society:

To the President of the North-Carolina State Agricultural Society:

Dear Sir:—Finding that the duties of Secretary of the Society and those of the Secretary of the Executive Committee, conflict with each other during the Fair week. I desire to resign the office of Secretary of the Society.

Very respectfully yours,
W. D. COOKE.

The resignation of Mr. Cooke having been accepted, the Society proceeded to fill the vacancy; whereupon, Mr. Jno. H. Bryan, Jr., was nominated. The President having asked if there were any other nominations, and none being made, Mr. Bryan was unanimously elected Secretary of the Society.

R. H. Smith, Esq., of Halifax, offered the following resolution, which was unanimously adopted, viz:

Resolved, That the Constitution be so altered, that the Annual Fair of this Society shall hereafter commence on the first Tuesday of November, instead of the third Tuesday of October.

On motion of Mr. R. H. Smith, it was also

Resolved, That the Executive Committee be authorized to have 200 copies of the Constitution and Journal of this meeting printed for distribution at the meeting of the Society in 1858.

On motion of H. K. Burgwyn, Esq., of Northampton, it was

Resolved, That three delegates be appointed to attend the Fair of the Virginia State Agricultural Society, of Richmond, next week.

The President appointed Messrs. H. K. Burgwyn, of Northampton, R. R. Bridgers, of Edgecombe, and Dr. Wm. R. Holt, of Davidson.

On motion, the Society adjourned, to meet to-morrow night, at 7 o'clock.

W. D. COOKE, *Sec'y.*

FRIDAY EVENING, October 23d, 1857.

The meeting was called to order by the President at 7½ o'clock.

The President announced Chas. L. Hinton and D. W. Courts a Committee to examine and audit the accounts of the Treasurer.

J. B. Littlejohn offered the following:

Resolved, That hereafter the Marshal and Assistant Marshals shall be elected by the Society.

After some remarks the resolution was laid on the table, on motion of W. W. Whitaker.

J. A. Boyden, of Rowan, offered the following:

It is ordered, That a Committee of three be appointed to inquire whether a Dynamometer can be procured, which is reliable as a test of the draught of ploughs and other implements, and if so whether it can be procured at a reasonable price, within the ability of the Society, and in case the affirmative thereto be found true, that the Committee be authorized to purchase one, at a price not exceeding — dollars.

W. A. Eaton moved to lay on the table, which was lost.

Mr. Boyden moved that the blank be filled with the sum of $75, which was lost.

Mr. Burgwyn moved for $50, which was carried.

After debate the question was taken, and the motion was lost.

J. P. H. Russ offered the following, which was adopted:

Resolved, That at future Fairs there shall be ploughing matches, and that it be the duty of the Executive Committee to provide for that purpose proper ploughmen and teams.

On motion of W. D. Cooke, it was unanimously

Resolved, That the thanks of the Society are due, and are hereby tendered to the Ladies who have given their assistance in Floral Hall, during the present Fair, for their valuable services.

Mr. Cooke also offered the following, which was unanimously adopted:

Resolved, That the thanks of the Society are due, and they are hereby tendered to those Railroad Companies who have transported articles to and from the Fair, free of charge.

On motion of W. R. Holt, unanimously

Resolved, That the thanks of this Society are due, and they are hereby tendered to our President for the able and dignified manner in which he has discharged the duties of the Chair, and for his zeal and labors in behalf of this Society.

The President, in a few remarks, acknowledged the compliment; he congratulated the Society on the important good they had already accomplished, and reminded them that that should be only an earnest of what they could and would do in the future.

On motion of W. A. Eaton, adjourned to meet in November next.

J. H. BRYAN, Jr., *Secretary*.

ANNUAL ADDRESS

DELIVERED BEFORE THE

NORTH-CAROLINA STATE AGRICULTURAL SOCIETY,

October 22, 1857.

By J. L. BRIDGERS, Esq., of Edgecombe.

Mr. President, Ladies,

and Gentlemen of the North-Carolina Agricultural Society:

We have met in behalf of the Agricultural and Industrial resources of North-Carolina, subjects which ever have been and ever will be of paramount importance to the human race, but more especially to those who are actually engaged in producing the means of feeding and clothing their fellow beings.

Agriculture presents a vast field for practical observation and an unlimited scope for the human mind to gratify its highest flights in the regions of physical speculation; its produce affords an occupation for the humblest laborer of the land, while the successful management of its principles presents difficulties which have hitherto baffled the most ingenious intellects of the age; its beginning for practical purposes the humblest mind comprehends, whilst its theoretical and speculative principles are still undefined and undefinable.

No State in the Union has physical advantages superior to those of North-Carolina. She has the best climate on this continent; the longevity of her inhabitants, the variety and extent of its *Fauna* and *Flora*, determine the value of the climate of a country. Prof. Baird, of the Smithsonian Institute, says there is every variety of animal life found in North-Carolina, combining the Northern and Southern Faunas in a remarkable degree, leaning of course most to the latter, and there are varieties of animals found almost exclusively in the State. The Census Reports prove that a larger ratio of the inhabitants of North-Carolina arrive at extreme old age than those of any other State in the Union. The quality of her rice sends it abroad for seed; the best bread exhibited at the World's Fair in London, was manufactured from North-Carolina wheat.

In Grapes, our climate stands unrivalled; the finest varieties are indigenous to our soil; indeed, it must be a balmy and genial clime, where the Scuppernong and the Catawba mature in the wild woods. It is conceded

by Longworth that thus far "North-Carolina stands ahead of any other State in the production of Grapes. But I cannot rank their Scuppernong among the number; I esteem that grape for table use as ranking with the Fox grape." Such is Longworth's opinion of the Scuppernong. No man who had ever gathered the Scuppernong, the prince of grapes, for table use, in its native land, would ever have compared it to the Fox grape. Hence, we may conclude, that the peculiar taste and fragrance of the Scuppernong are dependent upon climate.

As to the capability and great extent of the water-power and mineral products of the State, I would with pleasure and pride refer every inquirer to the reports of Dr. Emmons, whose labors do not seem to me to be sufficiently appreciated by our people. His Reports have extended the reputation and increased the wealth of the State.

Has our progress been equal to our natural advantages? It is difficult to estimate what has been the progress of North-Carolina; she has shown, perhaps, her greatest ability in extending the frontier of our country, and in furnishing the newly settled territories of the South and West with Governors, Judges, Senators and Representatives in Congress. From her bosom, for years and years long gone by, a constant stream of emigration has gone forth to the South and West; thus she has lost much of her best energy and intellect, and untold millions of her wealth. Whilst other States have been securing large accessions to their inhabitants and capital, she has been engaged in the more noble and glorious work of aiding in the extension of our Southern and Western frontier. Whilst thus aiding our common country, perhaps the Anglo-Saxon race, she was losing the benefits and renown she was conferring on others. The history of her distinguished sons who have left their native land, would compare, perhaps, favorably with those who have remained at home. Whenever the history of North-Carolina is written, let not her distinguished sons who have acquired renown in distant States, be forgotten, and it would take a volume to write the history of her sons who aided Texas in the darkest hours of her Revolution.

At the last census, there were 839,325 of the free native population; yet, startling to say of that number, only 556,248 remained in the State, showing that she had bestowed on other States 283,077, whilst she had received by emigration about 21,000. Ohio, during the same period, gained by emigration 242,670; if she had contributed as much in proportion to her population as North-Carolina, the number of her inhabitants would have been 504,246 less in native population; and had she received no aid from abroad, it would have been 900,000 less. How often do congressional and other speakers draw odious comparisons between Ohio and North-Carolina; Ohio receives the credit of an increase of population from abroad, and North-Carolina has none for the number of her citizens who have gone to other States to aid in carrying westward the Star of Empire. There is a tendency in the Anglo-Saxon race, to extend itself over the unoccupied surface of the earth, and in this great process, North-Carolina has performed a conspicu-

ous part—her progress when measured by her agricultural and commercial products, has not been so remarkable,—but in the number and quality of the citizens she has sent abroad, she stands unrivalled. Interesting to us would be the history of those North-Carolinians, who have become distinguished in other lands. In days gone by, we have suffered heavily by the disposition of our people to emigrate. Many young men grow up with a fixed idea to leave the land of their fathers on arriving at manhood, and to seek a distant home. How few plantations in our country are in the possession of the descendants of those who owned them anterior to the Revolutionary War? But now our young men grow up strongly impressed with the idea that they owe a solemn and life-lasting duty to their native land. They see on almost every road the traces of destruction; they see where nature has erected her monuments of many defeats, and man is nowhere defeated by nature in the path of duty. The dilapidated houses, the decayed fences, the abandoned fields and forests of the old-field pine, constitute unmistakable marks of man's failure and retreat. Then let us do our duty, our whole duty, not only to ourselves, but to the land of our nativity.

No people have ever become great in Agriculture until they have first felt the heavy hand of necessity. For in Agriculture we find that every people have reduced the original fertility of the soil to the last point of support, and when, and only when compelled by necessity have they commenced a career of progress. Hence we find, when the country is not too populous, that the Agriculture bears a certain ratio to the density of the population. New States are often noted for their heavy production, but seldom or never for skill in Agriculture. North-Carolina has felt the necessity for a higher grade of Agriculture, and we are daily witnessing the evidence of her increasing prosperity.

Another cause, and perhaps the greatest which has impeded our prosperity in Agriculture, has arisen from the habit of many of our planters of committing the management of their property to agents. The majority of persons who are interested in Agriculture to a sufficient degree to pursue it, as a liberal study, ordinarily give it very little personal attention. It is such an easy process to obtain a living by planting and cultivating, that few persons practically study the principles which seem so simple and unchangeable. In such cases the plantation is committed to the care of an overseer, whose main, and too often sole duty is to superintend the working of the hands, which, when well and properly done, requires his best energy; and he who faithfully overseers the various operations of the plantation will find but little if any leisure to conduct those experiments and make those observations so essential to Agricultural progress; yet he necessarily sees and observes much. He may observe closely and minutely the various crops, and collect many independent facts, but to use these facts and elucidate their principles, and show their bearing on science, leisure, books and learning are essential. Such interpretations and investigations belong to the Chemist and Physiologist.

To read and interpret the multifarious laws of vegetation, as exhibited by nature in the ever varying phases of vegetable growth, is the peculiar duty and privilege of the man of science.

Every operation of nature, however mysterious and secret, is conducted in accordance with the most rigid rules of science. Every fact observed in nature is dependent upon some general law. The interpreted laws of nature constitute the system or systems we call science. For, as much as we talk of science, and often as though it originated with man, the term only means nature interpreted. Hence we may conclude that Agriculture will flourish in proportion to the thought and energy it receives.

Have not every people just such a system of Agriculture as their wants demand? Here and there a demand for a higher grade of Agriculture has arisen, and forthwith it springs into existence. What is the best method to increase the demand for Agricultural improvement? Is there any better way than by explaining how the improvements may be made, and demonstrating the certainty of success? Believing that I can in this way best discharge the duties which you have assigned to me, I shall speak of the practice of Agriculture, and especially of its practice in the county of Edgecombe.

CLEARING.

In clearing our lands, as well as in every other branch of operations upon the plantation, we may use some of the principles derived from observing the laws of nature to great advantage. It is a universal law of nature, a scientific fact, that the tendency of all matter not in a healthy condition is to decay. By observing the decomposing or destructive agents of nature, we may learn to use them as a source of profit. It is a very expensive operation to clear heavily timbered swamp land in a green condition, but by a proper system of clearing it becomes almost a question of time. The first step is to drain, if necessary, so that the atmosphere may be more thoroughly admitted into the soil; then decomposition takes place much more rapidly, and the soil increases in fertility. So soon as the draining is completed, belt the entire growth as far as practicable. Many varieties of trees, when thus treated, begin to decay at the extremities of the roots; some bear fruit and stand two or three years after the extremities of the roots are dead, and many of the smaller roots are decayed. The decay which begins at the extremities of the roots gradually ascends until it reaches the surface, when most varieties of trees break off, and after the tree falls the roots and stump decay with great rapidity. Some trees when belted remain green until they fall; in such cases the heart of the tree, generally, and many of the roots, are dead, the entire tree shrinks below the belt, and has quite a dead appearance. Are we to conclude that the atmosphere acts through the leaves and sap, and that the earth acts through the hearts and roots?

When the belting is done imperfectly, the growth, to unite the bark, commences above and grows downward, and while this is taking place the

tree above the belt grows, and the part below seems to become less. I have noticed some peculiar exceptions to this fact in certain trees which have something on the bark of the appearance of what may be called eyes; when one of these is near the belting the upward growth commences, but in every instance the new growth had a rough and unhealthy appearance. Sometimes when the inner bark is left on, the growth proceeds from it. May not these facts throw light upon the relative influence of the atmosphere and earth in vegetation? Now, when the growth commences from the inner bark and proceeds outward, how does this agree with the generally conceded statement that the growth of a tree takes place between the bark and sap? Take a very small tree and the annual circle is inconsiderable; in years afterwards, when the growth has been rapid, the inner annual circles, though far removed from the bark, have greatly increased in relative thickness. If the growth is only between the sap and bark, how does this change take place?

After the tree is belted, a slight exudation, which is very fertile, takes place at the extremities of the roots; as soon as this commences the roots shrink and leave a porous space immediately around them, and thus the atmosphere is fully admitted; the soil around the roots, from their decay and the influence of the air, is soon changed in appearance, assuming more of a chocolate color, thereby indicating an increase of fertility; the root, by shrinking, may be easily drawn from the bark, and when this is done a deposit is discovered on the inside of the bark, known in the books as humors. Notwithstanding that the supply of humors thus prepared is small, it is sufficient often to change the general appearance of the soil.

It is well known that varieties of moss and lichens flourish upon decaying trees. They are nourished by the potash which abounds more in the bark than in any other part; and by observing these in damp and foggy weather we may easily discern a bright dye, which is potash in a state of solution, and thus in small quantities the decaying tree yields its potash without any additional labor. Also, the wind scatters the mosses and fragments of the tree over the surface of the earth, and by these several means united the fertility of the land is increased, and many swamps which would become hard, perhaps in part from want of ditching, are prevented from hardening for years. These advantages are the natural results from the labor of clearing the land.

Most low lands, after being thus treated, may, in a few years after being exposed to stock, be plowed without any great difficulty. The better the land is drained the more rapidly will the trees disappear, and the sooner it will become fit for the plow. I believe that all admit that belting the trees and allowing them to remain a few years is the cheapest method of fitting woodland for the plow. Some deny that land thus treated will produce better crops, but I have never known it denied by one who had tried both plans. Some argue that there is a great loss by the fall of trees in crop time, but this is insignificant when compared to the advantages, and the

absolute injury is overstated, especially when we recollect that most of the trees fall in winter and spring. In addition to these advantages it prepares an abundant material for ashes.

DITCHING.

There is every inducement for the planter thoroughly to drain his land. Ordinarily the number of ditches bear a proportion to their depth, so the deeper they are the fewer will be required to drain a given piece of land. It is very difficult to drain land thoroughly, without cutting to the sand; it is much more expensive to keep ditches open than to cut them. They discharge water in a compound ratio to their depth and width; a ditch only a foot wide has the same side obstructions as one ten feet wide; in proportion to the width, the smaller one is impeded ten times as much as one ten feet wide. It may be said of ditching, that the more thoroughly it is done the less the expense, for, as soon as the ditches are cut deep enough, many may be dispensed with which were required when the ditches were shallow, for ditches two feet deep must be twice as numerous as when they are four feet deep. Sand very often, and especially quick sand, presents the greatest difficulties; but by sinking the ditch gradually, the sand becomes firm and the difficulty disappears.

There need be no apprehension of draining land too dry, for, as soon as the earth becomes in a fit condition for cultivation, the water ceases to flow from it, for the very fact that water flows from the soil, shows that it is there in excess; there are soils which, owing to their porous condition, never make a good crop except in a wet season; hence, some hastily conclude that such lands are drained too dry. It has often been remarked that water will seek its own level; however true this remark may be in theory, if it is to be taken literally, it is certainly false on the plantation. For every planter has observed the hills greatly improved by draining the adjacent bottoms, they having been rendered too wet by the force of capillary attraction, which has often been well illustrated by placing a loaf of sugar in water and observing how gradually the fluid ascends to the top. In this case it seems to be seeking its own height, and such is its general tendency upon the plantation. Water is often observed standing near the edge of a ditch, and there remaining until it disappears by evaporation: sink the ditch to the sand, and the water generally disappears. Here we observe, from this fact, that the tendency of water is to disappear in a direction perpendicular to the surface, otherwise it would have flowed laterally into the ditch. We have a good illustration of this by observing how moist the earth remains under a thick board or rock; in a very dry time the earth generally becomes dry by evaporation, but as soon as the evaporation is obstructed at the surface, it is greatly impeded or entirely ceases; hence, we may infer that evaporation takes place perpendicularly, otherwise the earth would become dry under the board or rock; from these facts it appears that the water in many soils sinks and rises in a direction perpendicular to the surface, and only flows in a lateral direction when it strikes a spout or

a stratum more porous than the one through which it is descending; by remembering these facts, it is an easy matter to drain land whenever there is fall.

Quick-sands are sometimes troublesome, but they are productive of more apparent than real damage, by affording the negligent and careless an excuse for their imperfect draining, for, willingly availing themselves of a pretext, they cease their efforts as soon as they encounter a quick-sand. Such sand is the ordinary sand in a peculiar condition, owing to the presence of water; it generally rests upon an impervious bottom, so that the water cannot escape downward, it therefore seeks an outlet in another direction and carries the sand with it; remove the water and the sand becomes firm, or so soon as the water in the ditch ceases to flow through the sand or rises above it, the sand is harmless, which clearly proves that the water is the cause of the difficulty. If there is sufficient fall below to draw off the water, the difficulty at once ceases; sometimes, when the sand flows in laterally, the same object may be accomplished by increasing the width of the ditch sufficiently to prevent the sand from flowing to the centre of the ditch. But if the water rises in the bottom of the ditch it is a better plan to sink a gum through the sand to the hard pan, and draw off the water which will seek the more open vent. This plan will not succeed when the sand flows in laterally. I have succeeded finely in some few instances by this method, so the plan is suggested to be tested by experience.

Here allow me to remark upon the slowness with which agricultural information is disseminated. For the practice of ditching to the sand, to remove the surface water from certain soils, obtained more than fifteen years ago amongst the more intelligent of the planters of Edgecombe. I do not by any means intend to insinuate that thorough ditching is confined to any particular locality, but we are compelled to admit that in many sections the public seem to recognize no fixed principle therein.

There is another system of draining, known as surface draining, the object of which is to prevent, as far as practicable, the collection of water upon the surface. Water should not be allowed to stand on cultivated land; this may be accomplished best by uniting both systems. The surface drains are made with the plow and shovel, and are only of sufficient depth to lead the water to the ditch. There should be a drain from every place in the field where water stands, the object being solely to aid in removing rain water; ordinarily, they are plowed over and opened after every plowing. Occasionally, it is necessary to take water across some slight elevation, and then the spade must be used. It is advisable to remove the earth from the drain to the compost heap. By keeping such drains in repair, the water runs off as it falls and thereby prevents that thorough saturation of the bottoms which is so injurious to crops.

An excess of water is hurtful in several ways: 1. It excludes the atmosphere; 2, it changes the mechanical condition of the soil; 3, it retards decomposition; 4, it renders the soil cold by evaporation; 5, the roots of

many crops will not extend any deeper in the earth than the atmosphere penetrates, whilst other crops never mature if their roots reach the region of perpetual moisture; 6, it generates an acid or some other quality injurious to vegetable life.

As to the first point, it is a self-evident proposition, that when the earth is filled with water the atmosphere is excluded, for the atmosphere fills up all space which would otherwise remain unoccupied. The roots of the growing crops ordinarily descend to the depth to which the atmosphere is freely admitted, and on most soils that is determined by the plow. This is clearly illustrated by observing the field after heavy rains, when it will be discovered that the length of the roots is governed by the depth to which the earth has been broken. This is especially noticeable in the very narrow space in which the point of the cast plow goes deepest, for this space is entirely filled with the roots of the crop. One great object of plowing is to admit the air into the soil; when the crop is clean and has a slight crust, and is very soft beneath, I know of no other object for plowing.

Secondly: It is almost purely a question of observation. Every planter has noticed hard bottoms become soft and friable by ditching; this is so generally known that it might be argued that all hard lands are owing to an excess of water. After having been thoroughly saturated for some time, portions of the earth are dissolved, and on drying become hard. So, while the water is present, the atmosphere is excluded, and as the water evaporates the closeness and hardness of the soil continue to exclude the atmosphere.

Thirdly: It retards decomposition, and thereby renders the soil less capable of sustaining the growing crop. It is not known what length of time is required to decompose vegetable matter entirely submerged, for the atmosphere is the chief agent in decomposition, and every fact and argument that shows that an excess of water excludes the atmosphere from the soil, equally tends to show that it retards decomposition. In illustration of this, it is well known that the compost heap may be put up so wet that fermentation will not take place.

Fourthly: It renders the soil colder by evaporation, and consequently the crop more backward. This may be well illustrated by placing a kettle of water over the fire for some minutes. The water is only slightly warm, if so at all, what has become of the heat applied to the kettle? It has been received by the water in a latent condition. In the spring of the year, while the heat of the sun would have been warming the soil, it is engaged in evaporating the excess of water. In our short seasons would it not be much better to drain the water off with the spade, for the surplusage must be disposed of by the sun or the spade, before the soil becomes fit for cultivation.

Fifthly. There are some soils in which the roots of the crop seem to be limited in their downward tendency by atmospherical influence. In freshly cleared land, which is imperfectly drained, it may be observed that the roots of corn descend to a certain distance with great regularity; it will

then be ascertained that they cease their downward tendency at the point at which the water stood during the winter. And it may be announced as a proposition, so far as I know, universally true, that cotton never bears well when the top root reaches the region of perpetual moisture, and this is one of the reasons why the cotton crop so often fails on swamp land. This is so often the case that in the opinion of many planters swamp land will not produce good cotton, but this is an assumption the contrary of which may be proved by experience.

Sixthly. It is a well attested fact that some bottom lands which have been cleared, and also some which have not been cleared and poorly drained, will not produce a good crop the first year after draining. This is generally reputed to be owing to the acid condition of the soil. It is not so clear what is the cause, but there is no doubt of the fact. Sometimes such land fails entirely under a liberal application of manure. I have noticed an instance of a bottom which had been turned out for several years; it was ditched and planted in corn the same spring; from a gill to half a gallon of cotton seed was applied to the hill to note the effect of the different quantities. The crop, in a good season, was a failure, and two-thirds of the bottom did not mature a single ear; the second year the same land produced a fair crop, and the third year a much better one. Such facts are sufficient to convince the planter of the paramount importance of a thorough system of draining. Often the deleterious effects of imperfect draining are so slow and gradual as to escape observation, and the premature sterility of a once good soil is charged to the weakness of the ground instead of the ignorance of the planter.

MANURING.

Here we approach the great question of manuring, for we cannot believe that the Creator intended that the earth should diminish in fertility by cultivation any more than that he designed that the human race should linger and perish away from its surface. We go further: unless the earth can be increased in fertility whilst being cultivated, famine and pestilence are the final destiny of man, for there is a certain ratio between production and population. So we must conclude that the Creator has produced ample means for the support of the human family; for a while man may devastate the fairest portion of creation, but sooner or later he must yield to the laws of nature, and discharge those higher duties which every citizen owes to posterity; to support himself and family he is compelled to restore to the earth that fertility which in his pride and ignorance he had wantonly destroyed.

We have no means of computing the value of a proper system of manuring, whether as a source of national wealth or individual prosperity. It adds to the beauty of rural scenery, often restores health to the most sickly section by removing those causes which originate sickness; it substitutes activity

for stagnation and plenty for want; it banishes sterility and clothes the barren field with waving corn.

Should we not think that a system upon which posterity are to depend for support, would command the undivided attention of the agriculturist? Would we not think that every man who labors on the soil would at least attempt to follow those laws of nature productive of such magnificent results? We are pained to come to the unavoidable conclusion that the agriculturist ordinarily pays but little attention to those laws of nature to which he and his posterity can alone look for support. The very laws of nature not only point out the path which he ought to pursue, but require him to do so; stupidly and pertinaceously he refuses to heed nature, and often sickness, a continued warning, which unheeded becomes death, is the penalty of his wilful folly.

Why else has nature rendered almost every element of a health-destroying nature offensive to man? They have been made so to compel him to remove and bury them; they have been made fertile to reward him for the trouble that he is required to undergo to protect his own person. Here, as almost every where else, a knowledge of the laws of nature is profitable and pleasant, while ignorance is expensive and troublesome.

I will not follow this branch of the subject further, but let us return to the principles and practice of a proper system of manuring. The greatest difficulty is in obtaining the materials with which to manufacture the manure, and the question, with an air of credulity, is often asked, how is it possible to manure from three to five hundred acres of land annually? Soil and sub-soil constitute the great and illimitable supplies for manuring. I have never seen a soil, except, perhaps, some very coarse and sandy ones, which would grow any vegetable matter, which would not constitute a valuable element in the compost heap. Whilst using many varieties of soil, white sand itself becomes a valuable ingredient; sub-soils are often worth more than old soil cultivated incessantly for years. Perhaps in the future, the sub-soil is to become the main supply. The surface of all uncultivated lands, and of land not too long cultivated, yields a fine supply, especially low or swamp lands. Sometimes it will be convenient to leave small branches and ponds in the field to haul their contents to the compost heap; the ditches are often deepened and widened with the same intention; the grasses which usually grow in ditches, are valuable for this purpose, especially on land long under cultivation. Every old field which produces broom-straw, especially when used with marl or ashes, by taking off the surface, makes a fine manure. This material, combined with some very sandy earth, yields the most remarkable result I have ever seen. Some old-fields of very limited fertility, when treated with this preparation, produce remarkable crops of cotton; sometimes this compost surpasses the river mud with this crop. Fallow land yields a much better material than the same land under the plow, besides being much lighter to haul. The effort has been made to use the same soil designed to be cultivated, but unless the land is new or

lies fallow every other year, the heap soon fails. All soils and subsoils which may be fermented, and all vegetable matter which may be decomposed are valuable for compost.

In preparing for composting it is advisable, especially when the material is rough, to hoe or plough it sometime in advance, so that the atmosphere may be reducing it to a better condition. Rough soils and subsoils, particularly those recently drained, are very much improved by freezing and thawing. Perhaps it would be of advantage to speak of the compost heap more particularly: the compost here spoken of is put up in the field. For the convenience of hauling in the spring a heap is made in each acre, the material is thrown up with shovels as it is hauled in single horse carts; experience having shown that they are well adapted to hauling over cultivated land. The compost which is made in the summer is superior to that made in the winter. The heaps are broken up in the spring, and generally it is advisable to check the land so as to place the manure with more regularity; it is either placed in the drill or broadcast with the shovel. I shall consider the bulky material used as the mass of the heap and the other ingredients as stimulants or the decomposing elements. Haul together of the material designed to be used about one hundred and twenty-five loads, the load being five bushels. But if the coarse and apparently poor material is not made to undergo some change, the heap will be a failure; to accomplish this we select some active ingredient which will produce fermentation, and thereby release the latent fertility of the material. In Edgecombe the agents generally used for this purpose are cotton seed, stable manure, marl, lime, ashes and any vegetable matter easily decomposed, as the rank weeds growing about the ditch banks, and from twenty to thirty bushels of cotton seed to the heap.

In putting up the heap, place a layer of the material as thinly as possible, always remembering that the more thoroughly the soil and seed are intermixed, the more valuable will be the manure. If a supply of ashes or marl or any other alkaline substance can be procured, it will make a valuable addition; the ashes, from fifteen to twenty bushels, marl from twenty to thirty, are to be sprinkled over the cotton seed. Formerly, the seed and ashes were kept apart as much as practicable, but experience showed a better result when they were put together, for one great object of composting is to produce fermentation and decomposition, and the seed produce heat in proportion to the rapidity of their decomposition. Then let the mixture proceed as thoroughly as possible, until the heap is completed, with the top slightly rounding. The custom once obtained of putting up the heap in layers of seed and of earth without any effort to mix them, but this practice is now abandoned. When the seed are thrown up in layers, they are often black and mouldy, but if thoroughly mixed, it will be difficult to find a single seed when the heap is broken up. Whenever the seed appear in quantities, especially if partially stuck together, it is certain evidence that the heap has not passed through the proper change, for after fermentation

and decomposition, the rough and hard material becomes soft and friable and much lighter, and the seeds disappear.

After the cotton seed, stable manure and vegetable matter are exhausted, the composting is continued with marl or ashes alone, from 25 to 30 bushels of decomposed or disintegrated marl, and 20 to 25 of ashes are the quantities ordinarily used. For cold and stiff soils twenty-five bushels of pure stable manure, with the same quantity of material, make a more valuable heap than a like quantity of cotton seed. Where the materials can be easily obtained, it would be better in diminished quantities to use them all in the same heap. Some swamp soils, after having been exposed for some time, thrown up and allowed to decompose, act very finely without any stimulating ingredient whatever. Whenever lime, marl, or ashes, or all together are used, it is advisable to add pine straw or any other vegetable matter which is easily decomposed, to the heap.

We may secure a limited supply of vegetable matter of great fertility, by sowing peas thickly on the ditch bank, or other material to be used; the vines and roots not only supply a fertile ingredient, but they aid in the decomposition of the mass of the heap by some solvent power perhaps peculiar to the pea.

It is necessary to note the fact, that some soils and sub-soils freshly thrown up, do not yield to this treatment, so safely and strongly are the latent elements of fertility locked up. In illustration of this fact, there are many ponds and swamps abounding in fertility, yet they will not produce a crop the first year after draining. Such soils and sub-soils are generally spoken of as acid, without knowing the actual cause; when the soil is in this condition, the cotton seed are not thoroughly decomposed; they have become black and the hull hard. If it was purely an acid soil, would it not yield its acid in combination with lime, marl or ashes? yet such is not the fact. But when the same soil is exposed to the atmosphere, it becomes quite productive. May not this tend to show that the productive power of the earth is derived through the atmosphere? Should such unmanageable material be used in the beginning, it would have a strong tendency to confirm the belief that there is no peculiar advantage to be derived from composting.

How such results are brought about by composting, is a question for the learned to decide, and the only light we can afford on this subject is merely conjectural. Most lands by incessant cultivation will lose their productive quality, but by being worked only every other year, they would remain in good heart for a long time. Many, after being reduced by unintermitted cropping, may be compared to an over-worked animal, but they are only rendered unfit for present use. If this is not so, why does a few years rest increase the fertility of worn out land so rapidly? It is well known that incessant cropping alters the mechanical texture of soils, and so soon as this condition is brought about, the land begins to become closer, and the process is continued until the atmosphere is first partially, and then entire-

ly, excluded from the soil. Incessant cropping does more damage by excluding the atmosphere than by removing the particles of fertility. Hence, we conclude, that the great supply of fertility in the soil, is in a latent condition, that is, in one not fit for the growing crop. If this is not so, why does land produce for such a series of years when cultivated only every other year? We suppose that the fermentation which takes place in the compost heap developes or liberates the latent fertility in the soil and subsoil used, and thus, artificially, is produced the same result in a short space of time which it would take the atmosphere alone several years to bring about. It is in this way, we suppose, that the heap receives its increase of active fertility. Upon trial, there will be found many valuable supplies for compost on most plantations, which are unnoticed in the beginning of the system. It is a great mistake to suppose that only rich and valuable soils and sub-soils are fit to be composted; experience soon proves to the contrary; there are many ditches cut more for the material for composting than for draining.

Some of the most unlooked for results I have ever observed from composting, are from the use of a very sandy material; in many instances, it is advisable to add sand to the heap. Hence, it may be conjectured, that the fermentation produces some nitrate or silicate of potash which is known to be a very valuable fertilizer. We would suggest that the soft granite met with in many sections of the State, would be valuable, especially when pounded, to add to the compost heap to afford a supply of potash.

There has been so much written and spoken of late about guano and artificial manures, I shall pass them over without comment.

MARLING AND LIMING.

Instead of discussing these subjects, allow me to refer you to the Essay on Calcareous Manures, by Edmund Ruffin; the essay has been of great importance to the county of Edgecombe, and cannot be too highly recommended to those who are engaged in improving the soil, especially by marling and liming. Wherever the essay is read, its effects are observable upon the crops; yet, I do not agree with Mr. Ruffin in his theory of the action of lime.

ASHES.

The value of ashes to the planter has long been a familiar fact, but owing to the supposed difficulty of procuring them, their use has been limited; yet the great difficulty has been more apparent than real; they are only limited by the supply of fuel. By observing nature, the difficulty disappears. Light a candle and let it burn until it is consumed, and you will scarcely discover a trace of ashes until the flame begins to expire. As the fire gradually becomes extinguished, you will observe a slight deposit of ashes; by blowing out the candle every few minutes and then removing the ashes, and continuing the process until the candle is consumed, it will be discovered that at each time the fire goes out there will be about as many

ashes as when the candle is allowed to burn up at once. Hence, we may define ashes to be the residuum of imperfect combustion beyond the condition of charcoal; thus we see the various oils, coals, &c., produce such small quantities of ashes, because the combustion is so thorough. Observe this principle or fact, and the difficulty of procuring ashes will only be limited by the material to produce them. Observe how much wood is burned in the fire place, as compared to the small quantity of ashes, and we shall see that there is scarcely a limit to the combustion of ordinary wood under high heat. I have known an ashe house to be burnt, and with it more than one-third of the ashes. When they are procured at a low temperature, they may at a high one be reduced more than one-half of their bulk. By burning them at a low temperature the quantity is not only increased, but the quality is improved. These facts clearly prove that after having been reduced to an impalpable powder, mineral substances are reduced in quantity either by the heat or by being carried off by the atmosphere. Thus crops are supplied with ashes, lime and other minerals through the atmosphere, for we must conclude that they are borne to a distance, as we can discover no signs of a deposit around the oldest settlements.

Let us apply these facts to the burning of ashes. Experience as well as theory derived from these facts, shows that one hand should have several small fires to attend to, and should permit them partially to expire before pushing them up, ever mindful of the fact that it is the expiring and not the consuming flame which produces the ashes. A boy in the woods where there is much decayed wood, will procure more and better ashes by picking up and burning the limbs, fragments, &c., as long as the supply lasts, than a man cutting logs for the same purpose: the limbs and bark abound in potash, yield ashes superior to those from the bodies; the sap wood yields more than the heart, the roots give a very fine supply ordinarily, remarkable for their whiteness. Every kind of wood makes ashes valuable for some crop; the ashes from the different varieties of wood differ more in quantity than quality. Some value ashes for agricultural purposes in proportion to the potash they contain, but this is the very ingredient for which the soap-maker obtains them, yet every one knows that leached ashes are valuable for the crops; this proves that their value is by no means dependent solely on potash. The ashes of the pine are very valuable for cotton and peas; this is owing to the soda they contain, but the difficulty in procuring them limits their use; the pine burns so freely and rapidly that ashes cannot be obtained from it in any quantity.

PEAS.

I shall confine my remarks to the pea principally as food for stock; there has been so much written and spoken of the pea as a fertilizer, that there remains but little to be said. The vines seem to have some solvent power of their own, as may be seen by planting part of a field of new grounds in peas and comparing the two parts; next season it will be discovered that much more of the rough material has been decomposed on that part planted

with peas than on the other. It has been a well known fact for years past, that certain lands become lighter and softer by this means. Peas after potatoes is the crop which cotton follows best, but unfortunately, this fact does not universally hold true; for some planters have experienced a difficulty in procuring a good stand for cotton, while others have considered the cotton inferior after peas, though the majority think differently. The pea is a valuable crop for stock; it is a good plan to sow a separate field for the hogs, to start them to fattening early in the season. There is some controversy about the value of the pea, owing to its having a bad effect upon hogs; it sometimes has a very injurious effect upon them, impairing the action of the kidneys, not unfrequently producing bad health and death. It seldom has this effect, especially when the stock is turned on before frost, so that he can get a variety of food. It sometimes injures them by rendering the inner system partially torpid, but this is entirely removed by combining potatoes with the peas. The potatoe makes the system too active when fed by itself, which the pea, in turn, corrects. If the hog be turned upon the potatoes before frost, when he can eat the vines and leaves, he will not be apt to suffer, for the vines have the same corrective influence which those of the pea have. Pumpkins, after removing the seed, may also be fed to counteract the effect of the pea.

FALLOW LANDS.

In our immediate section there is but little fallow land; this is not a matter of choice but in consequence of the increased cultivation; this state of things is being annually removed by clearing. In years past many planters supposed that cotton might be cultivated for a series of years on the same land without any dimimution of product, but this theory is now generally abandoned. It is strange how much better the pine lands bear incessant cropping than the river and creek lands; there are pine lands in Edgecombe which have been worked more than twenty-five years continuously. In this case for some purposes the weaker land is the stronger. Lands after lying fallow, change their color to a slight extent and the soil becomes lighter; its texture gives way under incessant cropping, becomes clear and retains moisture more tenaciously, and as this result is brought about to the same degree is the atmosphere excluded. And one great reason why land fails so rapidly under constant plowing is that the soil being changed in texture is gradually deprived of the atmospheric influence; rest the land and it produces again. This is well illustrated by noticing how the ditches are gradually required to be deepened after a few years cultivation.

CULTIVATION.

Thorough cultivation is absolutely essential to the production of fine crops; it cannot be performed without putting the soil in a proper condition before planting. I shall confine the few remarks I make under this head, to the cultivation of cotton.

Cotton should be planted early and shallow, for every plant with a broad leaf, which indicates that the plant is to a considerable extent dependent upon the atmosphere, if it remains under the soil long after germination comes up bleached and in a very unhealthy condition. It is desirable that it should all come up as near the same time as possible; to effect this, the opener must have a guage so that the seed may be planted a uniform depth. There is no plant which requires earlier cultivation; the plows and hoes should be started as soon as the plant is up sufficiently to mark the row from one end to the other, for it is never too little to work after it is up. The sooner it is thinned, too, the better, for if this is not done early it runs up spindling without throwing off any limbs near the ground where the best bearing limbs are usually found. It is owing to the same fact that we so seldom see cotton produce a good crop which has once been grassy. So soon as the soil is stirred the young plants feel the influence of the atmosphere, and there is no plant to which it is more essential. Hence we clearly see the great necessity for early cultivation. The remark may also be repeated here, that cotton never bears well when the top root reaches the region of perpetual moisture.

It should be borne in mind that work is much more profitable when done to prevent the coming of grass, than when done to destroy it. There are industrious planters who always have grassy crops, for the simple reason they will not plow to prevent grass, but wait for the grass to come and grow so that they may have the pleasure of destroying it. It is well known that it takes grass several days to come up after a plowing, depending more or less upon the moisture of the soil; the deeper the plowing the longer the grass will be in coming up, and many industrious planters have grassy crops from this cause. Cultivate very early and keep the crop very clean.

So soon as the cotton is thoroughly open it commences losing length; a single rain sometimes diminishes the length of the open cotton ten per cent. The same field when picked as rapidly after opening as practicable, yields a much heavier crop than when allowed to remain in the field; the longer it remains open the more difficult it is to pick out; it is always in recently opened cotton that the hands do their best day's picking.

SCIENCE.

In the foregoing remarks I have confined exclusively to the *practice* of agriculture, and it is proposed to make but a few remarks on Science. The term science as before observed only means nature interpreted. The man of science has raised expectations which cannot be realized, the planter expects too much of science which has scarcely assumed a definite shape. The great difficulty lies, as has often been remarked in comparing the results of the chemist with the operations of nature. There is no unit or standard whereby they can be compared, and until this link is supplied the progress of agricultural science will necessarily be slow.

A growing plant must use some solvent, is it water, or a fluid, or a semi-fluid peculiar to the plant? How can the solvent used be decomposed to sulphuric or muriatic acid? If the chemist in analyizing a coarse sandy soil, used only water as a solvent, he will find a very poor soil, yet by using a strong acid he finds from the analysis that the soil is fertile. Now what the planter needs most from the man of science is an analysis which will tell him what per cent. of the soil is in a condition to be available for the growing crop. Hence the planter cannot rely with confidence upon the analysis of the chemist.

In observing corn planted in rather hard ground, it will be discovered at times before it comes up that the end of the sprout has a semifluid secretion which dissolves the earth to afford a space for it to make its way through the hard earth, and thus the corn comes up perhaps as much by means of a chemical as a mechanical influence. Here is a vast field of observation and experiment, for perhaps by their means the tender plant may afford information of great importance.

But the planter does not give the man of science that assistance which he ought to do. Suppose every planter was required by the nature of his business to keep a record of operations corresponding to the log book of the mariner, who would dare to predict the results which would spring from such a collection of facts! How little did the sailor when making his records of the winds and tides, think of the great results which would flow from the entries then made to protect and direct him in his onward voyage. Did it ever occur to him that they would ever be of any practical value to him after he had completed his voyage?

The manifestations of the winds and seas were the unwritten language of the atmosphere; yet the mariner as he made his record could not interpret these terrific displays of nature; but in the course of time the interpreter appeared, who could and did interpret the mysterious language of nature as spoken through the winds and waves. What untold millions of value has Maury thus bestowed on the world!

When will the planter ever collect a sufficiency of facts for some future Maury to translate the laws of vegetation from observed phenomena into the English language. Does not every plant, shrub and tree, by outward signs visibly illustrate the changes within? Does not the expanding bud notify us that the plant has commenced its annual career? Does not the growing leaf inform us of the daily secretions of the plant? Do not the various shades of the leaf and flower tell of the chemical changes within? Is not the matured fruit evidence that the plant has completed its annual task? Does not nature for some wise purpose cause us daily to witness the growth, maturity and decay of vegetation? Do not the laws a nature daily record upon many plants the chemical changes within? Here nature keeps a record and we refuse to translate it; her records of vegetation are fleeting, because it is our duty to perpetuate and study them as they arise. Do we not find the physical history of the world recorded by nature?

Has she not imbedded deep in the earth specimens of the varieties of animal and vegetable life in the distant past? Does not the lava of the ancient forgotten volcano afford us materials for its own history? Have not the great convulsions of nature been recorded upon and by the rocks and various stata of the earth? Does not every tree and every vegetable keep a record of its own age?

The laws of nature are uniform; when we see a result, nothing but ignorance prevents us from referring it back to its first cause; thus it is that the physical history of the world has been written from interpreting the laws of nature and applying them to the records of the rocks and the remains of animal and vegetable life in the earth. Let the planter furnish the materials and facts he daily passes by unheeded to the man of science, then may he raise his expectations. Let me not be considered as decrying the importance of science; it has taught the planter to reason about facts heretofore regarded as mysterious, and thus he becomes an enquirer after knowledge, a proved resolution for him. Let not the planter expect too much from science, without first doing his duty. Then we shall soon see the morning star of Agricultural Science succeed to the now scarcely perceptible glimmering of light; then soon shall we enjoy all the splendors of the brilliant rays of the noon-day sun of science. May the day be not far distant!

AN ESSAY

ON

HORIZONTAL PLOWING AND HILL-SIDE DITCHING.

By NICHOLAS T SORSBY, M. D.,

OF ALABAMA. *

DEDICATION.

This unpretending production is respectfully dedicated to the Farmers and Planters of the State of North-Carolina, as a testimony of his tender regard for them, and love for his native State, by

THE AUTHOR.

FORKLAND, GREEN COUNTY, ALABAMA,
October, 1857.

TO THE COMMITTEE ON ESSAYS:

Gentlemen: You perceive from the length of this Essay, that it has cost me a good deal of *time* and *labor* to write it. Rest assured, I would not have written such an Essay for any other than the Agricultural Society of North-Carolina.

I was induced to write it from the interest I feel for the progress of the Society and the advancement of the Agriculture of the State, and as the only and best way I am able to assist them.

If awarded the Premium, the Society is at Liberty to publish all, or any part of it, and as many copies as they desire, but I beg leave to reserve the copyright; and as I have no copy of it, I would be under many obligations to them to return it, when it has served them in the manner they desire.

By so doing they will much oblige,

Very respectfully,

Their ob't. serv'nt,

N. T. SORSBY.

FORKLAND, Ala., Oct. 13th, 1857.

* A Premium of $50 was awarded by the Society to this Essay.

PREFACE.

This Essay was written in compliance with the demands of the North-Carolina State Agricultural Society.

The writer having felt the need of such information, in days past, feels he would be uncharitable and ungrateful to withhold, and not impart his knowledge on the subject, to his brother farmers.

He has endeavored to serve them in a feeble manner, in a matter deeply concerning their pecuniary welfare, and tried to arrange the subject in a systematic form, and explain the different methods of the horizontal culture, so that the humblest mind can understand and appreciate them.

Each article is separate and distinct from the others, and yet are connected together by the general bearing of the subject.

Should this small effort in behalf of the soil of North-Carolina, meet with the approbation and requisitions of the members of the Agricultural Society, and receive the careful perusal, study, and application of its principles to the soil, by the farmers and planters of the State, the writer shall feel that his labor is not lost and his talent not buried in oblivion.

INTRODUCTION.

It has been but a few years since the subject of this Essay was brought to the notice of the American farmer.

It now occupies an important and prominent position among the scientific operations of the Southern Farm.

It may be considered as a new branch of agricultural science, founded upon correct and well established principles of the sciences of Engineering and Hydraulics; and essential to the welfare of the farmer, to the preservation of the soil, and to good husbandry.

Forced, almost by necessity, and the strong sense of self-interest and foresight, a few intelligent minds have been brought to discover the urgent need of reforming the old destructive system of plowing in straight rows up and down hills, and of substituting the better mode of horizontal culture.

The absurdity of the old method is really a subject of astonishment and mortification, to those who practice the new methods. The arable lands of the South have been nearly exhausted by it and a careless and wasteful culture.

The beauty and simplicity of the principles and practice, as well as the advantages of the new methods, can only be realized and brought home to

the farmer and planter, by observation, study and practice, and when once understood, they will wonder at their past folly of land-killing, and grieve to know they practiced it so long, when a different and better system is so easily learned and pursued.

When we reflect upon the disasters to the soil, occasioned by the pursuit of the old method, and see the apparent apathy to, and indifference with which the more perfect and better system is viewed by some intelligent farmers and planters, at the present enlightened era and golden age of agricultural science, we feel alarmed for them, for their lands, and the succeeding generations.

What a poor inheritance to hand down to an industrious son, an old dilapidated homestead, with an old worn out, galled and gullied farm! Think of it, farmers and planters!

The very sight of decay all around, excites in the mind of the young man, disgust, despair, a disposition to abandon the old place, once so dear to him, and the family, now so much abused, and seek a newer and better place, richer land, among strangers. He has no desire to cultivate the worn out old-fields, and perhaps there is no new land to clear. The old method of plowing up and down hill, has much to answer for; it has driven many a young man to the South-west, and perhaps, eventually, to prison, or the gallows, who might have been a useful citizen, could he have remained at home, and made a living.

Whilst the *horizontal culture* and the *ridge* and *furrow system* are attracting the attention, and being adopted by intelligent planters and farmers, its principles must be studied scientifically and practically, and new discoveries in the art applied, tested, and settled in the minds of men, or else there will be no end to the diversity of opinions that may arise, and lead to discussions that may retard the advancement of the new science.

It would require much time and space to elucidate the different methods of the horizontal culture, as fully as some men may desire, perhaps.

We have endeavored to simplify it, and should some of our readers not comprehend it perfectly, all that we can say to them is, study the principles laid down here, and then take the *level* and follow the plumb, and it will lead them over more tortuous and obscure lines than we have penned here, and a few horizontal rows run with patience and care, will teach them more about it than was ever dreamed of in our philosophy.

Our aim has been, in writing this Essay, to collect together our ideas on this subject, to compare them with others, and deduce from them correct principles, and upon these principles establish with fidelity, practical rules, and thus accomplish by a general survey of the subject, and a brief enumeration of the details founded upon our own experience and observation, all that we think the State Agricultural Society of North-Carolina requires of the writer.

HISTORY OF HORIZONTAL CULTURE.

We regret to state that we have not been able by a careful research of all the Agricultural works that we have been able to examine, in the English and French languages, to find the origin of this system of culture.

Mr. Thomas Jefferson, who was a close observer of improvements in Agriculture, in a letter dated "Monticello, 6th March, 1816," says, "My son-in-law, Colonel Thomas M. Randolph, is, perhaps, the best farmer in the State; and by the introduction of the Horizontal method of Plowing, instead of straight furrows, has really saved this hilly country. It was running off in the valleys with every rain, but by this process we scarcely lose an ounce of soil.

"A rafter level traces a horizontal line around the curve of the hill or valley, at distances of thirty or forty yards, which is followed by the plow; and by these guide-lines the plowman finishes the interval by his eyes, throwing the earth into beds of six feet wide, with large water furrows between them. When more rain falls than can be instantly absorbed, the horizontal furrows retain the surplus until it is all soaked up, scarcely a drop ever reaching the valley below.

"Mr. Randolph has contrived also, for our steepest hill-sides, a simple plan which throws the furrows always down hill. It is made with two wings welded to the same bar, with their planes at a right angle to each other. The point and the heel of the bar are formed into pivots, and the bar becomes an axis, by turning which, either wing may be laid on the ground, and the other then standing vertically, acts as a mould-board. The right angle between them, however, is filled with a sloping piece of wood, leaving only a cutting margin of each wing naked, and aiding in the office of raising the sod gradually, while the declivity of the hill facilitates its falling over. The change of the position of the share at the end of each furrow is effected in a moment by withdrawing and replacing a pin."

It seems Colonel Randolph introduced this method of plowing into Virginia, previous to 1816, as Mr. Jefferson states, he was acquainted with it two or three years previous to writing this letter.

This is the earliest notice that we have seen of the use of the horizontal culture, as practiced in the South at the present day. It would be gratifying to know from whence he introduced it, and where it originated.

In "Taylor's Arator," published in Virginia the beginning of this century, on the subject of plowing hilly lands, it is stated "that such lands will admit of narrow ridges, as well as level, by a degree of skill and attention so easily attainable, that it has existed in Scotland above a century past under a state of agriculture otherwise execrable, and among the igno-

rant Highlanders. It is effected by carrying the ridges horrizontally in such inflections as the hilliness of the ground may require, curved or zigzag, preserving the breadth. The preservation of the soil is hardly more valuable than that of the rain water in the successive reservoirs thus produced to refresh the thirsty hill-sides, instead of its reaching to and poisoning the valleys."

It is very strange, if this system was pursued in Scotland so very long ago, that there is no mention made of it in English works.

During an extensive tour, and residence of over three years in Europe, from Great Britain to Naples, Italy, through Holland, Belgium, France, Switzerland, and parts of Germany, we never saw, heard or read of its being pursued in any of those countries, as it is done here, and we cannot conceive how it could have ever been practiced in Scotland and not kept up now-a-days.

In our travels throughout the United States, we have seen it pursued from Mississippi to North-Carolina. We have been to Monticello, several times, when a student at the University of Virginia, and though remarking the productiveness of the soil there, and around Charlottsville, we were too young to notice the mode of culture, but we are sure we never saw a rafter-level or any other level applied to land in Virginia. Had we seen it we should have noticed it, because we had followed it before we went there to school, in 1836.

In "Thair's Principles of Agriculture," a standard German work, in speaking of plowing ridges, he says, "the most advantageous disposition of them that can be made on an inclined surface, is to give them a horizontal or standing direction;" but he says nothing more on the subject. Had he been acquainted with the method as pursued in the South, he would have written considerably on it.

We are inclined to believe the Horizontal system of plowing is of Southern invention. We are astonished at the fact, since the Southern planters and farmers have the reputation of being such careless and wasteful cultivators of the soil.

We consider it the most important discovery of the modern agricultural era. So important is it to the South, and to the soil in every part of the world where it rains like it does here, that the discoverer of the method deserves the lasting gratitude of the Southern people, and a place upon the tablet of memory next to that of the father of our country.

Hill-side ditching and guard-drains, were discovered subsequent to the origin or introduction of the horizontal system into Virginia. They were first introduced into that State soon after the introduction of the horizontal method, about 1815 or 1816; by whom, we do not know.

The first written notice of the horizontal culture and hill-side ditching that we ever saw, was in the pages of the "Southern Cultivator." Major E. D. W., our step-father, first introduced the method of Horizontal Plowing on the level system into this county, in the spring of 1834. He had read

a notice of it in some paper, which induced him to try it on some hilly land at the Dial Place.

He used the rafter-level and plummet-line, and ran off rows to be plowed four feet apart into beds for corn and cotton. We were a boy then, and carried the hoe and made the chop marks for him. He was so well pleased with the results of it, and with his experiment, that he has continued it ever since with great success on two plantations. He has a thousand or more acres under the plumb. He has tested it thoroughly, and has preserved the fertility, retained the soil, and improved his lands, aided by a proper application of manures, under a severe course of cropping. Without this system, all the manure he could make would not preserve half of the land in its present state of fertility for five years. He would as soon abandon planting as to abandon the horizontal system of culture.

We have assisted him in the work a good deal, and induced him to try guard-drains and hill-side ditches about 1851 or 1852, in order to lighten his labor and lessen his care and attention to it, as he is getting old and the confinement to the field and exposure to the cold during the winter and spring, are injurious to his health. But, he says, he could dispense with the drains and ditches if he could attend to the plowing in person every spring, and direct the work and correct the errors of the previous year's work.

An old negro horizontaler lays off the rows, and attends to one plantation where there are between six and seven hundred acres under the plumb; and manages it astonishingly well for a man of his understanding.

His lands were originally of a good quality, and are of a mixed character. On one plantation, the grey and mulatto sandy land prevails, the subsoil being yellow and red clay a foot, and eighteen inches originally, in parts of it, beneath the surface soil. The balance of the land is a chocolate loam on a red clay subsoil. Some of it is considered stiff red clay land. On the other plantation, the chocolate loam prevails with a close, stiff red clay subsoil, requiring a long and sharp pointed plow to penetrate it when moderately dry. The rest of the land on this plantation, is grey and gravelly sandy soil, loose and porous. Most of the land on both places, is gently undulating ridges. Some of it hilly, and some knolls. The stiff red clay land is the most difficult and expensive to cultivate, and is the best land for grain. It is also the most difficult of his land to manage on the level method of culture.

I took my first lessons under him in the science, and owe him a debt of gratitude which can never be paid. He taught me the level culture, and I taught him the grading method. I commenced planting in 1844, in Hinds county, Mississippi, near Jackson, in copartnership with a brother. The *level culture* No. 1, and the *grading method* No. 1, both combined, without drains and hill-side ditches, had been in use a few years on that plantation. The soil, a close, tenacious, marly clay, of a yellow color, changing into an ashy colored soil, when thoroughly disintegrated and cultivated a year or

two. I was partial to the level culture, and he to the grading method. I found out after a better acquaintance with the land, that the level culture retained the water too long, and made the land too wet for cotton. The grading method drained, but washed the land a good deal. After testing both methods to my satisfaction, I gave into his views rather from an avaricious motive than otherwise, to make better crops, though at a sacrifice of some land that took the streams and disappeared. From one to three inches fall were given to each row, when practicable, and the short inside rows plowed on a level. The land was rolling, and drains between the ridges conveyed the water into ditches and branches. We continued both systems until I left in December, 1850, and moved back to this place. The grading method has been kept up by him. I commenced a mixed system here in 1851, and have practiced both of them to a certain extent.

My land is chocolate and grey sandy land, on a red and yellow clay subsoil. The grey land is of a fine texture, and much of it runs together and bakes. The chocolate land is loose and porous. It is generally a little undulating, some rolling, and some flat basins and ponds. It requires much ditching and surface drainage, and some under-draining. Forest growth, pine, oak, hickory, chestnut and poplar, with a variety of undergrowth.

My experience and observation teaches me, that the *level culture* is the best method ever discovered to prevent arable land, of the majority of soils in the South, from washing by rains, but not the best always to secure good crops. The grading method is the safest as a general rule for the culture of cotton, and can be pursued to great advantage on many soils that could be cultivated well on the level method, when one is willing to lose a little soil to make a better crop, by draining the land. No one system of culture is, then, applicable to all soils; and on large plantations of mixed soils, both the level and grading systems should be applied. He is a fortunate man who understands the different methods well enough to apply them to the best advantage to the different soils, on a large plantation. It requires close application to field study, a good knowledge of the geology of the soil and the agricultural character of the land, with years of experience, to know how to cultivate land to the best advantage to the soil, and to the increased size of the purse.

SECTION I.

Definition of Horizontal Culture.

Horizontalizing, Circling, and Leveling land are different terms employed by *Agriculturists*, in the *South*, to mean the same thing; viz: cultivating land in parallel lines run by a leveling instrument to direct and control rain water with the plow.

SECTION II.

Its Objects.

The objects of the System of horizontal culture are, to irrigate, to drain, and to preserve arable soil, in the simplest and most economical manner.

1st. By collecting, maintaining, and distributing rain water, on the surface of arable land, it effects natural irrigation.

2d. By conveying it away, by artificial channels, it effects drainage.

3d. By a proper system of irrigation and drainage, the soil and the food of plants are retained, and the fertility of the land is preserved.

SECTION III.

General Considerations.

Rain water being a solvent of the food of plants, and the medium of supplying them with many of their elements, the system of horizontal culture teaches us to control, and diffuse it in the soil, and distribute it in such a manner that the food of plants it contains, may be made available to the utmost degree, in promoting their growth; and, when it exists in excess, to remove it without injuring, or washing away the soil.

Hence, we conclude that a correct system of manuring and improving land, depends greatly upon a proper regulation of water by the horizontal culture.

We perceive, then, that the horizontal culture is a beautiful branch of the science of Agriculture; that it is a mixed art, a combination of irrigation, drainage, and manuring. We cannot, therefore, study it well, appreciate it properly, and practice it successfully, without some knowledge of agricultural engineering, of the geology of the soil, and hydraulics, and the application of them to irrigation and drainage.

We can then realize and appreciate the several advantages and connections of these branches of science with each other, in developing the chemical and physical properties of soils, and in the improvement of the fertility of land. To practice it scientifically, and successfully, we must study and understand the geological formation, and the agricultural character of the soil, and ascertain by observation and experiment what plants grow on it best, and are most profitable to cultivate.

Drill-husbandry, that is, the cultivation of crops in drills, by the ridge and furrow method, is indispensable, and the check and hill-culture are inadmissible except on level lands, as a general rule, by the system of horizontal culture. Of course, the broadcast method can be employed, as well with one method as with the other. The horizontal culture, by the ridge and furrow method, conflicts with the practice and opinions of many farmers, in

the oldest of the Sothern States, who advocate the check and hill culture; but an acquaintance with the horizontal culture changes their practice and opinions.

SECTION IV.

THE DIFFERENT METHODS OF HORIZONTALIZING LAND

Are divided into two principal systems: viz:

1st. The level Method of Culture.

2d. The Grading Method of Culture.

The Level Method, (*or Irrigating System*,) is divided into two methods; viz:

1st. Horizontaling with an instrument, on the level culture, without the aid of guard-drains, and hill-side ditches; and,

2d. The level-culture, aided by those drains and ditches.

The Grading Method, *or Draining System*, is divided into four different systems, viz:

1st. Horizontaling with an instrument, giving a grade to the rows, without the assistance of guard-drains, and hill-side ditches.

2d. With a grade to the rows, the same as that given to the drains and ditches, accompanied by those drains and ditches.

3d. With a grade given to the rows so as to empty their water into the drains and ditches.

4th. The straight-row method. The rows run up and down hills, and empty into hill-side ditches.

Besides the above methods, there is the old mode of horizontaling with the eye, without the aid of an instrument, or guard-drains, or hill-side ditches.

SECTION V.

THE DIFFERENT METHODS EXPLAINED.

The old method of hill-side plowing by running the rows around hill-sides with the plow, directed with the eye, is mere guess work, and only an approximation to accuracy, and of course is very imperfect.

It is done with the object of retaining the rain water in some instances, and of removing it in others; in either case, it cannot effect the object in as perfect a manner as the new methods of level and grade work done on correct principles, by the leveling instrument.

When the object is to retain the rain water, it answers tolerably well in some countries, on porous, poor, sandy soils, where the showers are not frequent and are light, and where the leguminous crops are cultivated mostly

on high beds and lands, as a substitute for artificial irrigation, and where the spade and hoe are used, generally, for the purpose of forming the ridges.

When adopted to drain hill-sides by the plow, unless the soil is not disposed to wash, it is very liable to do more injury to the land by washing it away than benefit by removing the water.

It should not by any means be resorted to now, since we can substitute better methods for it. It is the first step towards the horizontal culture from the straight-row method; and was perhaps invented for the purpose of retaining instead of removing water.

1. *Level Culture or Irrigating System.*—By this method the rows are laid off with a leveling instrument on a perfect level, and the land cultivated without the aid of guard-drains, or hill-side ditches.

Here, science steps in to correct the imperfections of the eye.

It is impossible to lay off a level row by the eye. The most skilful horizontaler cannot judge with accuracy the degree of inclination of lands, and discover all the inequalities of surface well enough to horizontal land on a level by the eye. But, with a *rafter-level* properly made and adjusted, it can be done, on an even or uneven surface with perfect accuracy, on a dead level: and if the land be properly plowed the rows will hold all the water that falls on them.

It is the best and only system ever invented to prevent comparatively level, and gently undulating lands, from washing.

It is intended to ratain all the water that falls on land just where it falls: this is natural irrigation. We all know the value of water for the nourishment of animals and plants. They cannot live without it. Crops often fail for the want of it. By this method none is wasted. Enough water is absorbed during winter and spring rains by land cultivated on this system, to almost make some crops, especially when aided by light summer showers, that would fail to do so, cultivated by the grading method. This method is most applicable to all poor, thirsty, porous sandy soils, whether they rest on clay or sandy subsoils; and to many varieties of clay soils not too compact and retentive of water.

We think we may say with truth, that we never knew, in this country, but one kind of clay soil, on uplands, that this system was not applicable to, on the ground of making it too wet for profitable culture. That is the fine, close, tenacious, marly-clay soil, resting on a retentive yellow clay sub-soil, of the black-jack, post-oak, and hickory ridges of Hinds, Madison, Yazoo, Carrol, Holmes, Warren, and other parts of Mississippi.

Besides this kind of soil to which the level culture is objectionable, are the compact red and yellow clay soils of some hilly lands, and the blue and white clays of low-lands.

The red and yellow clay lands may be cultivated by it, if they admit of subsoiling to advantage. It is seldom that the level culture is objectionable for corn and small grains, and the root crops. But when it causes the soil to become too wet during the cultivation of crops, to plow well, and hastens

a rapid growth of grass and weeds that destroy the crops, it is an evidence that it should be abandoned, and a grading method substituted for it.

2. *Level Culture with Guard-drains, or Hill-side ditches.*—The rows are plowed on a level, and guard-drains, or hill-side ditches are added, with a slight grade to correct the evil of the excess of water, and remove it, should the ridges break. Some soils, such as close tenacious clays, though plowed deep, may absorb a great deal of water during heavy and repeated rains, until the plowed soil becomes well saturated; the water will then sink until it reaches the impervious strata, not broken by the plow, and move along that strata on steep hill-sides, until it accumulates in such quantities as to break the ridges, and flow downhill, carrying the soil with it.

Again, in clay soils, plowed shallowed, a heavy rain succeeding another heavy rain, that had run the land together, and baked by the sun, and closed its pores, may cause the water to accumulate in level rows until the volume and weight of water makes a breach, and some of the ridges give way, and the water is precipitated from row to row till it reaches an outlet.

A mole, a stump, bad plowing, the wheels of a cart or waggon, and other causes may break the ridges, and cause the land to wash. To prevent such a disaster, guard-drains, hill-side ditches have been invented, to aid and protect the level culture, and to correct the ignorance and errors of the inexperienced horizontaler, and save his time, labor, and soil. But, in many instances, they encourage careless work, and are sometimes evils to the system. They should not be relied upon too much; the remedy is sometimes worse than the disease.

1. *The Grading Method, (or Draining System.)*—The great object of this method is surface drainage, of arable land: hence it is divided into,

1st. Horizontaling with a grade given to the rows, without the aid of guard-drains and hill-side ditches.

Every row is designed to drain itself, and of course the other drains are unnecessary. It is a kind of self-sustaining system, and a substitute for straight rows. It is beautiful in theory, but difficult to practice in a general system, on all soils. Some fields, and parts of fields, no grade is necessary, whilst different grades are required according to the inclination of land, and the physical properties of soils, and the length of rows. The length of rows is very irregular by this method, and short rows emptying into long ones, pouring their water into them, force them to wash into gullies. Hence, it is impossible to prevent the soil from washing by this method. It should be confined to close clay soils. This method, combined with level culture, answers a better purpose.

2d. *Horizontaling with a grade given to the rows* the same as that of guard-drains and hill-side ditches. This method was adopted, doubtless, to correct the evils of the preceding method.

When the drains are well made, they check the flow of water descending down the hills from the broken rows, and thus convey it away and protect

the land beneath them. Without their aid much mischief might take place, but if the work by the preceding method be well done, there is no need of the drains to aid it. Imperfect work, then, excuses their employment. But they are indispensable evils to the system they are used to protect, and are much employed.

3. *Horizontaling with a grade given to the rows* so as to empty their water into guard-drains and hill-side ditches.

This is truly a draining process, employed on clay-uplands, and low-lands, and answers a good purpose when the rows are not too long, and the fall is correct. Of course the drains and ditches require considerable fall, and to be very capacious. It is popular with those planters who have clay soils, and trust much to overseers, and negroes, and kind Providence for gentle showers, to make them crops. But overseers make mistakes, plowmen do bad work, and the clouds pour down heavy rains, and the soil, as it were, melts and runs rapidly away. To answer a good purpose, the overseers, plowmen, and drains require strict attention, or the land will be injured by this method.

4. *The Straight row Method, with Hill-side Ditches.*—The ditches in this instance are cut on hill-sides with considerable fall, and the land is plowed on the old straight-row method, the plowman raising his plow over the ditch banks as he passes them. It is evidently a troublesome business to raise the plow over the ditches, and keep them clean. If the soil be sandy, and disposed to wash, the ditches must be deep and large, the fall great, and the plowman careful, which is contrary to negro character, or else every heavy rain will fill up the ditches with sand, break their banks, and cut the land into gullies and galls. However, it has the recommendation of being simple, and better than the old up and down hill method, without the protection of ditches.

Experience will soon teach any one that it is a bad system for hilly lands: for low-lands it answers a good purpose for quick and effectual drainage, and enables some low-lands to be cultivated that could not be without this kind of drainage.

On the rich low wet lands, and the rolling up-lands, in the prairie or lime lands of Alabama and Mississippi, when too wet, this kind of expeditious drainage is the *sine qua non*,—the proper method to remove the water, and dry the land in time to prepare it for a crop, and to save the cotton from damage by excess of water.

SECTION VI.

Philosophy of the Level Method.

It is true there are deep, sandy, alluvial soils that absorb all the water that falls on them during the heaviest rains; but again, there are other soils when cultivated on the straight-row method, that are injured by the irreg-

ular distribution of water, one part of the field being drained too much, whilst the land below it is being drowned; thereby, both parts sustaining an injury. The crops on such land grow and mature irregularly in consequence of the irregular distribution of the water and the culture. The level culture corrects these evils. It retains the water and soil in its proper place, and when the land is cultivated alike, all remains nearer the condition of dryness, and the crops grow off more uniformly on the same quality of land and mature nearer the same time.

Should the land be manured, the elements of the manure remain where deposited, and not removed by the first rain to the nearest ditch or branch. It irrigates and preserves the soil, when properly done. It is the best method to employ to aid in restoring exhausted lands.

It is very difficult to lay down any set of rules by which to do the work; because, the physical properties of soils are such, and the inequalities of land vary so much, no one rule or set of rules would apply to any great extent of surface. One part of a field might require the level culture, and another part the grading method. Hence, we are forced to adopt the one or the other, according to circumstances, and to do the work correctly, we must be acquainted with all the different methods.

It matters but little, where the work begins or terminates in the field, so the rows are laid off accurately, on a level. The most important rule is to follow the level, let it lead to whatever point it may. It will run at every point of the compass, and form rows of every imaginable form and length, terminating any where in the field. It will lead the new beginner in the art, into a maze from which he can scarcely extricate himself, but he should have patience and perseverance, and all will come out right and no land be lost. He must be content to follow the level, but not try and make it follow him, and force it to any particular place or termination. The only way to terminate a row at a certain point, is to start the level at that point: but ten chances to one, in returning, if the next row does not go off at an angle, and terminate at some distance from the first starting point. It is immaterial whether the rows be long, short, straight or crooked, or where they begin and terminate, so they are on a level, and the land be well plowed in rows or ridges. This should ever be borne in mind. The horizontaler will make mistakes, and be awkward at first, but will learn to do the work correctly.

SECTION VII.

Advantages of the Level Method.

This system is the best mode of cultivating land ever invented, to prevent the devastating effects of rain water washing away the soil and the manures put upon it. It enables the soil to absorb more water, and retain it better, and give it back to plants when needed, more effectually and regularly than

any other mode, thus preventing the deleterious effects of drought. It makes the soil more uniform in production; improves its fertility by retaining the manures; makes it easier to work, with less labor; causes the crops to grow faster, more uniform in growing and maturing; and as the rain water is evenly distributed on all parts of the field alike, when one part can be plowed, all can be done at the same time, and saves time turning around at wet land.

Disadvantages of the Level Method.

It seems in the order of things in this world, there is always an evil attached to almost every good. So it is in this instance, but we shall find that the disadvantages disappear by practice, and are counterbalanced by the advantages.

The disadvantages are, the unavoidable necessity of having so many short rows terminating at any part of the field, forcing the plowman to turn around often, and lose time by so doing: (this time, however, is made up in the greater number of long rows.) The injury to the crop, done by the plow, the mule and the hand in turning around at the end of the short rows. The difficulty at first of doing the work well, and of plowing the rows out without breaking up the work, and deranging the rows. The constant care and attention, by the overseer or employer, to maintain and keep up the system. The necessity of using the ridge and furrow system and abandoning the check and hill culture.

SECTION VIII.

Philosophy of the Grading Method.

Surface drainage is one of the most important operations connected with the tillage of the Southern soil. The value of the grading method cannot be over-estimated. It has to contend with a troublesome element, that is a moveable element, always seeking its level, whose particles have a great affinity for each other, and running together whenever they can, thus accumulating in a mass, and increasing its volume and velocity when in motion. This element we wish to control with a level and the plow on the surface of arable land, and derive all the advantages of it we can as a feeder of plants, and at the same time, get rid of the excess that would prove injurious to the soil and growing plants. Nature does this for us in some soils and teaches us how to do it in others. It sinks the water in porous soils, and stores it up for future use of plants, and removes it when superabundant, from undulating close clay soils before it does injury to the plants that do not require it, teaching us to level porous thirsty soils, and deepen and drain compact close soils. We should study carefully the operations of nature, and apply its beautiful principles to the present subject, and conform them to the limited capacity of the uneducated minds of men. Very

few fields of one hundred acres have the same inclination of surface, and one variety and depth of soil. Land slopes in every direction, and each hill-side or plane of inclination requires sometimes a different mode of drainage and a different method of culture.

In examining a field, we may find some acres requiring the level culture, others again, one method of grading, and another a different method, and so on perhaps, through the whole list of the different methods of grading. It would be improper, then, to employ one system alone for every part of the field. The different methods should be applied according to the demands of the land. Science should guide us, and the one-system horizontaler is led into error by his efforts to apply it to all localities and inclinations of surface of land. We should be acquainted with all the systems, and not make a hobby of any one. Better try first one and then another, in experimenting, and select those that are best and most applicable to the land. If we find a straight row more convenient and better than a crooked one, if it be correct, adopt it, without sticking to the idea that the horizontal culture consists of a system of crooked rows. Experience will soon teach the new beginner the degree of grade necessary to give to his rows and drains, and the number of drains or ditches to use, to drain a certain area of land. The grade to the rows and drains is governed by the kind of soil, the declivity of the land, the extent of the surface to be drained, and the method of horizontaling they are intended to aid. If the level culture, with drains, be adopted, a few shallow guard-drains with a fall of from one to two inches for every span of the level, may answer in moderately close clay soils, and less fall in porous sandy soils. If the grading method be adopted, the fall of the rows and the drains depends upon the kind of method of plowing used, and the nature of the soil cultivated. We should recollect, that the washing power of water descending a hill recently plowed, is dependent upon the declivity and the length of the hill, the depth of the plowing, the character of the soil, and the quantity of water in motion. Hence, the greater the fall, the longer the hill, the shallower the plowing, the more porous and light the soil, and the greater the volume of water, the more the land will be washed. If the grade be not sufficient and the dimentions great enough, the rows are apt to be chocked and broken. A regular and proper grade must be given, and if an error be committed, it should be on the side of too little fall. If the grade be too much the rows will wash into gullies. Guard-drains and hill-side ditches should have grade and capacity enough to drain the land speedily and effectually, without having their sides and bottoms washed too much. With a proper fall and dimensions, they may be used to convey sand to fill up gullies, basins, and deposit it convenient to cover galled places.

SECTION IX.

Advantages of the Grading Method.

It possesses all the advantages of surface drainage of arable soils in a simple and the best possible manner without doing serious damage to the land. It is the best method ever invented to assist in breaking up galls and gullies, and filling up depressions in the land, and the beds of old ditches and branches, as well as ponds, basins and bogs, and in aiding the plow and the hoe in restoring worn out soils.

It possesses, also, many of the advantages of the level culture.

Disadvantages of the Method.

By careless construction of drains, and neglecting to attend to them afterwards, they are liable to choke and break, and wash the land below them into gullies. When they have too much fall, each row or drain is apt to wash into a gully, and do harm to land below their mouths by covering it with sand. They distribute water irregularly, and where not demanded, drying the ridges and hills too much, and drowning the bottoms. Upon the whole, they are of minor importance compared to the benefits of drainage.

SECTION X.

Subsoil Plowing

Means loosening the subsoil with a plow without any mould-board to turn it up.

We have seen, Nature teaches us three important operations that are essential to the perfection of the horizontal culture, viz: to open, to deepen and to drain the soil.

An open, deep and dry soil, we all know, can be cultivated to better advantage and profit, by either the level culture, or grading method, than a close, shallow and wet soil by any method. The latter requires much labor and time to open, deepen and drain it, and if a good soil the labor pays, if a bad soil the labor is often lost.

Under the soil of some stiff red clay lands, long cultivated, originally good, there frequently exists a strata of compact clay and land, called a hard-pan, formed by the treading of the stock and sole of the plow, cemented together by oxide of iron, clay and fine sand. It exists, sometimes, in gravelly soils, but less frequent. Wherever it prevails it makes the land hard to cultivate, and it produces sorry crops. It is always on extremes of wetness or dryness. Such land is difficult to horizontalize.

Again, the plow forms in clay land, on the subsoil, small gutters or

channels, into which the water sinks, accumulates, flows and washes the soil, obstructs the work of the horizontaler by breaking the ridges and undermining the banks of drains and ditches when they are not made deep enough on hill sides to extend below these channels.

The subsoil plow aids very much the horizontal culture by breaking up the hard pan, the gutters or underground water furrows, galls and gullies, on clay lands; it opens, deepens, pulverizes the subsoil, drains the surface soil by sinking the water, and extending the area of air, manures, and the roots of plants, and thus producing a decided amelioration of the soil and subsoil.

The best time to do the work is winter and spring, when the land is moist and soft, and when time can be taken to do it well. The most effectual plan is to open a furrow with a two-horse plow, with a good turning mould-board, and follow in the same furrow with the two-horse subsoil plow, as deep as both plows can be drawn. If the time cannot be spared to run so many subsoil furrows, half the number will answer a good purpose. An expeditious plan for corn land is to open the water furrow between the ridges, with a scooter plow, deep, and follow it with the subsoil plow; put in the manure, and bed out with scooters and shovels, finishing with a turning plow to make a good water furrow.

When employed in lands for small grain the subsoil plow can be run to advantage in the old water furrow, which is the centre of the land when plowed out, and also in the new water furrow left open. We need not fear subsoiling clay and gravelly soils when hard and compact, especially when old and much worn.

SECTION XI.

Trench Plowing.

This differs from subsoiling, by raising up the subsoil, and mixing it with the surface soil, with a turning plow following in the furrow of another turning plow. It brings up the subsoil, disintegrates the hard-pan and distributes them through the surface soil. It is of great assistance to the horizontal culture, by breaking up the gullies, galls and hard-pan, and thus lays the foundation of the process of restoring the fertility of worn out lands.

If the soil was of a good quality originally, and the subsoil of the same quality, trench plowing is of much advantage to the land to deepen and mix the two. But if the the land be poor, and the subsoil poor red clay, the trenching should be done by a scooter plow, following in the furrow of the turning plow with the view of breaking up the subsoil, and pulverizing it, without mixing them too much. Mixing a poor clay with a poor soil is bad policy, unless much manure is added to improve it. Subsoiling and

trench-plowing are often confounded with each other, but, are quite different operations.

SECTION XII.

Land-galls.

These are abrasions of the soil, by rain water removing the soil of clay lands long cultivated by the old wash away method, and leaving the clay exposed. They might be very properly called land-sores, of a virulent character, and hard to heal. The best way to treat them, is to scarify them deep every spring, sow them down in peas, plow them in the fall, and sow in rye; repeat the same operation next year, cover them with all the leaves, stalks, long manure of any kind, and the third year a tolerable crop of corn or cotton may be grown on them. To manage them to the best advantage, they should be surrounded, or cut off to themselves, by guard-drains, or hill-side ditches.

SECTION XIII.

Gullies.

These are open water-channels, caused by rain water and careless up and down hill plowing. They are hideous objects to the eye of a scientific and practical farmer, and should receive the condemnation of all good husbandmen.

There are many ways of filling them up, but in doing so, sometimes two are made in place of one, unless it be properly done and aided by the horizontal culture. The land requires to be well graded and the direction of the water changed, and not be permitted to flow so abundantly down the gullies as before. When they are less than three feet deep, they may be stopped and filled up in two or three years, in this way: Every twenty steps drive up stobs or oak boards across and in the gulley, close together, to catch and hold the dirt and water in part; then, throw in leaves, tussucks of grass, corn and cotton stalks, pine straw, pine tops, with the laps up hill, and plow up and down on each side of it, and drag in as much dirt as possible with hoes. Sow them in peas and rye, and let grass grow in them. Plow horizontally across, keeping the same regular grade in passing them; to do so, the rows will make a curve up and down.

Large gullies will require more labor and time to fill them up. Cut a ditch across them at proper distances apart, and pile logs on each other in the ditch, until the top log reaches above the banks of the gully. Now gather all the rubbish, stumps, stones, logs, leaves, pine saplings, with the laps up hill, into the gully, and draw in all the dirt convenient and pack it against the logs, and on the pine tops; so as to make a dam. The drains

and hill-side ditches can be emptied into them, and supply dirt to fill them up. Allow grass, weeds, peas, and small grain to grow in them. In a few years they will be filled up, and bear some crop every year to hide them from the gaze of a neat farmer.

SECTION XIV.

Guard-drains and Hill-side Ditches.

Guard-drains are shallow, open water channels, made with the plow and hoe, on arable land, laid off with a leveling instrument, with a regular and gentle grade, directed around undulating ridges and hill-sides, for the purpose of receiving and conveying away superfluous rain water.

Hill-side ditches are a variety of guard, or catch-water ditches, but intended to operate more effectually than they, by having a greater capacity and grade, in order to remove a greater volume of water in a shorter time from hilly lands. They are a part of the system of horizontal culture, and are used to aid and protect it, and correct its defects. We may very properly term them the safety-valves of that system, when properly constructed, and waste-ways when improperly constructed.

They are valuable adjuncts to the horizontal culture, and especially to the grading methods, when made according to correct principles of hydraulics. On loose, sandy lands, they should be dispensed with whenever it can be done with safety, and as few as possible be used, and they as far apart from each other, and as short as the nature of the land will admit of, to effect the desired object. Clay lands, that have been plowed up and down hill, in straight rows for years, and a good deal abraded and washed into gullies, require the drains and ditches to be well made. It takes two or three years sometimes to break up the old water furrows and gullies, and turn the curve of the water, unless deep plowing be combined with the grading method. Guard-drains usually answer the purpose on gently undulating lands.

Hill-side ditches are best on hilly lands. Inexperienced horizontalers would do well in commencing the horizontal culture, to employ drains to protect their imperfect work. They should be made as short as possible, avoiding all abrupt curves or sudden bends, and directed around ridges or hills from a medium point, dividing the water and discharging it on both sides of the ridge or hill into a ditch, gully, branch, or outside of the field, where no damage to adjoining lands may be done. The fall should be gradual and uniform, and just sufficient to discharge the water without washing their sides and bottoms.

The size of drains and ditches should be determined by reference to a variety of circumstances, the combined influence of which may generally be estimated in practice, although not reducible to any very exact rules, viz: 1st, we must consider the annual quantity of rain; 2d, the quantity which

falls on the land during a heavy rain; 3d, the nature of the soil as to porosity or compactness; 4th, the inclination of land; 5th, the length of slopes and extent of surface to be drained. Every horizontaler must take into consideration these things, and judge for himself.

A general and important rule as to the capacity of drains is, that they should exceed rather than be deficient in the dimensions ordinarily required to discharge the quantity of water for which provision is to be made. A good rule by which the depth of drains may be estimated, can be derived from a knowledge of the character of the soil and its action upon water. Thus: a light, deep, porous, sandy soil, will absorb water as fast as it falls, if it lies level; if undulating, it will absorb it not so fast, and the deeper and more porous the soil and sub-soil, the more and faster it will absorb. On the contrary, a shallow, sandy soil on a clay sub-soil and clay lands, will absorb less water, more slowly, and more of it will pass off. It will follow the under-ground plow furrows when absorbed, and the drains should extend below those furrows to catch the water. The close clay soils, and the stiff lime lands absorb water slowly, and if they be deep, the drains should extend below the soil, and nearer together than in porous soils.

The kind of drains to be used, their depth, and distance apart, can be ascertained by experiment alone. It is safest for the new beginner to follow the example of those who have tested them on similar soil to his, and where found to answer well.

The following scale of the depths and distances of drains and ditches, may give an idea of what they require, according to the classification of soils into compact, medium, and porous, each of which variety may be subdivided into several degrees of porosity and retentiveness:

CHARACTER OF SOILS.	DRAINS.					
NOT SUBSOILED.	DEPTH OF SOILS.		DEPTH OF DRAINS.		KIND OF DRAINS.	DISTANCE APART.
POROUS.	Feet.	Inch's.	Feet.	Inch's.		According to the Declivity of Land.
Light loam, (fresh land,)	1	00	0	10	Guard-Drains.	Wide apart.
Sandy " "						
Light gravelly Sand, - -	0	10	0	12	Guard-Drains.	Wide apart.
Coarse gravelly Sand, - -						
MEDIUM.						
Clayey Loam, - - - - - - -	0	8	0	12	Guard-Drains.	Not so wide apart.
Gravelly Loam, - - - -	0	10	0	10	Guard-Drains.	Not so wide apart.
Friable Loam, - - - - - -						
COMPACT.						Need subsoiling.
Tenacious Clay, - - - - - -	0	6	1	00	Hill-Side Ditches.	Close together.
Friable Clay, - - - - - - -	0	8	0	12	" " "	" "
Soft Free Clay, - - - - - - -	0	10	1	00	" " "	Not so close.

If the land be subsoiled, the drains must be deepened, and made wider apart. The tenacious clays are not very commonly cultivated in the South. They are too wet for cotton.

SECTION XV.

Drill Husbandry

By the ridge and furrow system, in contradistinction to the check and hill method, is indispensable to the horizontal culture. Ridging and bedding up land is so familiar to every plowman in the South, little need be said relative to the manner in which it should be done. They are made both by shallow and deep plowing. We prefer shallow plowing and flat beds, in new ground, stubble or sward land, and in porous light sandy, and loose gravely soils. Deep plowing is best in old hard upland clay-soils, that need deepening and opening, in bald prarie lands, and in low wet lands of both kinds.

The height of ridges and lands are dependent upon the kind of culture, the crop grown, and the character of the soil.

For potatoes, we desire them high when the plants are set, and when the crop is laid by.

For corn, we prefer them flat in dry uplands, higher in lowlands, with clean water furrows.

For cotton, in fresh land, and porous alluvial, and light sandy lands, moderately flat beds may answer very well. They are regulated by the width of the beds. In clay lands, the cotten beds should be high and narrow, and the water furrows deep and clean. We prefer not to plant cotton in wet land, but if it be done, high beds well drained, is the only remedy against the disastrous effects of water. The cotton beds are made close or wide, according to the quality, and productiveness of the land. In rich river bottoms, and black cane-brake lands, they vary from five to eight feet wide. Thin and medium quality upland, sandy and prarie lands, they vary from three to four feet in width ; some poor lands, they are as near as two and a half feet apart.

We cultivate our land in ridges for corn, cotton, peas and potatoes ; they vary in height and distance according to the quality, and dryness of the soil. They are from six to fourteen inches high, and from three to four feet wide apart, that is, from crown to crown. When desiring to sow small grain on land, in ridges, we sow the grain, and plow four or five ridges into a land, and preserve the direction of the rows.

We sometimes sow cotton land in oats and rye, and throw four turning plow furrows on the grain, and plow out the stalks with a large two horse shovel, thereby making a flat bed, drained by the water furrow, and preserving the width of the beds.

We sometimes sow rye in the fall in cotton land, and run two sweep furrows in each row. In very porous land, if the rye be sown just before cattle are turned in the field, no sweep furrow need be run.

SECTION XVI.

THE ADVANTAGES OF THE RIDGE AND FURROW SYSTEM

Are, that when the ridges or beds are well put up without too great an inclination, it facilitates drainage by breaking up the crust formed on the surface of land that is sometimes so close and tenacious as to prevent the water from sinking into the subsoil beneath the roots of plants; it exposes a greater surface and depth of land to the action of the sun and air; it enables land to be cultivated that cannot be cultivated on the hill and check method, or any other method; it renders land drier and less subject to the destructive effects of wet seasons; it makes land easier to work at all times, with less injury to the crops; the plowing of spring and summer are less hazardous and laborious; the tillage of spring and summer is more certain and effectual; the crops have a nice, mellow bed of loose, dry and warm earth to grow and expand in above the cold and wet subsoil; in fact, an artificial climate is produced, which improves the health, and hastens the growth of young and tender plants that demand such especial care during spring; and finally, it prevents land from washing away, and is the basis and support of the horizontal culture.

SECTION XVII

THE CHECK AND HILL METHOD.

This method answers a good purpose on very loose, porous, level pine lands, for potatoes and ground peas, cultivated mostly with the hoe. It is objectionable to the horizontal culture because it upsets and breaks up the horizontal rows, and turns the water loose, on the land, and destroys the effect desired by the horizontal system.

SECTION XVIII.

PLOWING STRAIGHT ROWS BY STAKES.

This method has been pursued by farmers, for ages, and is the favorite plan with the majority of them at this time.

The great ambition of the plowman who lays off the rows, is to make them perfectly straight, regardless of hill or valley, across the field from fence to fence; nothing but a ditch stops him.

It is astonishing to see the accuracy with which it can be done by a few stakes set in a line with each other. Of course, the rows make beautiful drains to dry the hills, and cover up and drown the valleys with sand and water. The hill tops and sides are in a few years cut into gullies, and the soil precipitated into the valleys to impoverish them with sand and clay.

This is truly, the wash-away land killing method, and should be abandoned by every farmer, or planter who cultivates hilly lands. Level plains of sandy land, can be plowed in this manner very well, without doing much injury to the soil, particularly, if the rows are changed and crossed every year or two. We adopt straight rows whenever we can run them on a level.

SECTION XIX.

Horizontaling by the Eye.

Instead of running the rows up and down hill, in straight lines, this method directs them around the hills, and diagonally across them, with a considerable fall to them.

If they are directed diagonally across the fields, and desired to be straight, they are laid off by stakes. If intended to circle the hill, the horizontaler walks around the way he desires the rows to run, and the plowman follows him, and lays off a guide-row. The rows are then laid off by the guide-rows. This is guess work, and very inaccurate. We have seen a very intelligent planter, who was familiar with the horizontal culture, circle a basin badly gullied, on horseback, followed by two plowmen, one laying off after the other. The basin was surrounded by a guard-drain that kept the water from the adjoining land out of, and conducted it off out of the field. The plowmen and the horizontaler were below this drain. As they passed over the gullies, it was "gee Ben, haw Dick, haw Ben, gee Dick," sometimes in rapid succession, and was very amusing. We called this work a horizontal farce.

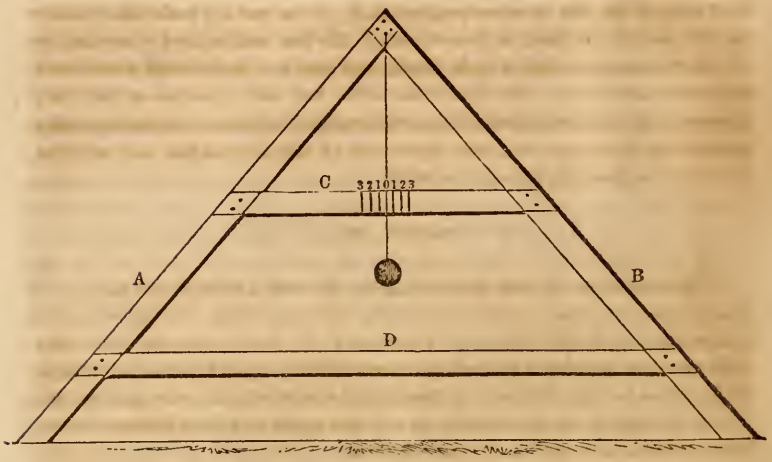
The rows were laid off like the track of a snake in the sand, and had they not been protected by the guard drain, they would have been cut into many troublesome gullies and galls.

SECTION XX.

The Span or Rafter-level.

Of the many leveling instruments in use, among Horizontalers, the above is the best, because, it is the simplest, the easiest of application, and is most generally employed. Besides any carpenter can make it.

In horizontaling land it is necessary to success, to keep a perfect level of the rows in the level culture, and a uniform fall of them, and the drains in the grading system. The most convenient and handy level is made with a span of 12 feet 4½ inches, and 6 feet high. This span is $\frac{3}{4}$ of a perch: So that, we can readily calculate the length of the rows and the ditches, and estimate the rise or fall of them per perch.



THE SPAN OR RAFTER-LEVEL.

Explanation of the Figure.—To construct this level, take two strips of dressed heart pine plank, well seasoned, A B, 3 inches wide, $\frac{3}{4}$ inches thick, and 12 feet 6 inches long. Another strip for a foot brace, $1\frac{1}{2}$ inches wide, $\frac{3}{4}$ inches thick, and 11 feet long. D.

Also, another for a middle brace, or graduated bar, 2 inches wide, $\frac{3}{4}$ inches thick, and 6 feet long. C. Lap one end of A and B together, let them into each other, and make them secure with wood screws, so that when fast the other ends of the strips may be 12 feet $4\frac{1}{2}$ inches apart from outside to outside, and the level, when finished, be 6 feet high.

Make the foot brace, D, fast to these two strips, one foot from the ground, when the level is standing on its feet.

Make the middle brace, C, fast to the same strips, three feet from the top, and saw off the ends of all, so that the level, when completed, will have the dimensions, and span the distance above mentioned. Paint it, and when dry graduate it thus, viz: Suspend a plumb line with an ounce lead from the centre of the top, and let the bob extend two inches below the middle brace.

With a spirit level find a perfect level on a plank, and stand the Rafter Level on it. Mark where the plumb line crosses the cross bar with a pencil, and the places occupied by the feet; change the feet, and put each in the place occupied by the other; mark again with a pencil where the plumb line crosses the bar; if it crosses exactly in the place it crossed before, that is the centre of the level, and the true line; if not, the exact distance half way between the two lines is the level line. To be very exact, the assistance of a spirit level will find it. The true line of level being found, mark on the top of the bar 0, and make a plain line on the

front side of the bar to correspond with 0. Now put a ½ inch block under the left foot of the level, and mark where the line settles, and ½ on the top of the bar; remove the ½ inch block, and put a 1 inch block under that foot, and mark where the line crosses the bar, and 1 on top of the bar; proceed in that manner until it is graduated to 6 inches. Repeat the same process for the right foot, and other side of the line on the bar, and the level will be graduated ready for work.

SECTION XXI.

Application of the Rafter Level to the Level Culture.

The manner of using the level is the same for both methods, with this difference: for the *Level Method* the rows are laid off, and plowed on a dead level, whilst for the *Grading Method*, a fall is given to the rows and drains.

It is necessary to be more accurate, and apply the level oftener for the level method, than for the grading method.

Before going to work, we must determine upon, first, the kind of crop to be cultivated; second, the character of the soil; third, the inclination of the land, whether comparatively level plains, undulating ridges or hills; and fourth, the method of horizontaling desired.

To illustrate and explain the different methods, we will select a forty-five acre field, which we call the Gin-house field. Upon examining it, we find a plain, a hill, a ridge, a basin, a pond, and the balance undulating irregular surfaces, and wet flats and ditches. The soil is a grey, and dark sandy land, on a yellow and red clay subsoil, of medium quality, that has been much abused by bad plowing, and constant cropping. It presents a sufficient variety of soil, and undulations of surface, necessary to explain our subject.

It was horizontalized by me in 1851.

SECTION XXII.

To Horizontal a Plain by the Eye on the Straight Row Method.

We will go to the field, with the level well graduated, accompanied by a small boy, who carries a bundle of canes or green sticks, some one foot, and some six feet long. A sensible plowman, with a quick, tractable mule, with a scooter or rooter plow, and a hill-side mould-board plow follows.

To try the skill of the plowman, and the temper and spirit of the mule, we select a plain on which the Gin-house stands, for operation. We suppose the field to be a stubble-field, having been always plowed up and down hill. Having determined upon the direction of the rows, and the points of departure and termination for them, we direct the plowman how to proceed, order him to set his stakes, "be sure you are right, and then go ahead,"

and lay off four feet rows. As negroes' memories are short, and they are careless, and mules slow and stubborn, we wait to see him started. If he proves to be inefficient, and lays off crooked rows, irregular distances apart, and can do no better, we dismiss him, as not trusty and skilful, and procure another plowman, because much depends upon his skill for our work to succeed. Should he answer the purpose, we leave him and go hence to

SECTION XXIII.

Circle the Round Basin.

This basin has been partially drained by a ditch passing through it, and emptying into the main ditch, but never succeeded, because the ditch has never been deep enough, and the margins of the basin are too high to admit of deepening it enough without much labor.

We desire to circle it on a level, so that each row may hold its water, and keep it out of the ditch as much as possible.

We will commence at the ditch, at the east side of the basin, above the margin of the basin, where the land is comparatively level, to lay off a guide-row that may embrace all the sloping land inside of it.

We set the feet of the level on similar ground, and move the forefoot, that is to lead off, until the plummet line, or spirit bubble, indicates the true level. We stick down a long cane by the side of the plumb for the guide stake. We then move the level and put the hindfoot by the side of the stake, and move the forefoot from side to side, until the true level is found; we move it again, and put the hindfoot exactly in the place the forefoot occupied, and find the level again; we stick a short cane down under the plumb; we move the level again, and proceed in the same manner, getting the level every time, and sticking a short cane down every third, and a long cane down every sixth span of the level, until we surround the basin, and return to the point, or near the place we started from, and we put down a guide stake there. The level may return to the ditch above or below the first guide stake. It makes no difference, so the line is run correctly, where it returns to the ditch.

We now lay down the level and walk around and examine the stakes. We will, perhaps, find them standing very irregularly, not in a perfect curved line, but a little zigzag. A skilful horizontaler can detect in a moment, by the eye, almost where the true line of level is, and can move the stakes and re-set them, so that the line will have a more regular curve; it being somewhere between the stakes, inside of some and outside of others. Having arranged the stakes to our fancy, we start at the guide stake, the plowman following, and we walk from stake to stake, the plow moving them as the mule throws them down, and the little boy picking them up, until we arrive at the last guide stake, which is likewise plowed up.

We have now laid off and plowed a circular row, not a perfect circle, and

if there be no sudden curves in it, and if it suits our fancy, we let it stand; but if we have any doubts about its accuracy, we take the level and try it, and if necessary, mark the inaccurate places, and run them over with the plow.

We now move the plowman on the inside of this guide row, and commence four feet from that row and run a row by it, the plowman carrying a four-feet measuring rod, with which he occasionally measures the distance between them to see that he keeps the proper distance; and thus he keeps around until he returns to the guide stake. As the ditch is narrow and shallow he passes over it, takes another row, and goes around as before, on the basin side. We take the level and follow him, and test his row to see if it be correct, and if there be any variations of importance from a true level, we stop him and correct it. There are two or three ways of doing this. A very convenient way to keep the row going on around, is to widen the distance between the rows a little at one place, and narrow it at another. Or, if this cannot be done, we put in a short row beginning at the ditch and going around until the defect is corrected. We have then to start another row and lay off by that, which the plowman can do, and go around again. Sometimes it becomes necessary to widen or narrow two or three rows, or put in two or three short rows, before the defects are remedied.

In finishing the basin, the rows get shorter and shorter until we have to wind up with a few short straight rows run parallel with the ditch. This concludes the work inside. We now examine the first guide row and the land surrounding it, and if we see that it has not embraced all the sloping land, we run one or more rows on the outside of it, either entirely or partly around the basin, as the case demands. If the basin had no outlet by a ditch, we could commence to circle it, on either side, and go around and stop on returning to the guide stake, nearly opposite to it. We then get on the inside of it, and run the rows by it, as above stated. It is seldom that a guide row on making a circle, returns and meets again. Sometimes, when we start to circle a basin, we commence so far above the margin of the slope, that the level goes off into the field instead of around the basin; in that event, we go lower down on the margin to commence, so that the row may go around the basin. But, if we find it necessary after trying the level method for this basin, to protect the rows by a guard-drain from the water around oozing into them, we can lay off a guard-drain around it, to catch the water and discharge it into the ditch.

If we find, upon experience, that the level culture is not applicable to the basin, we can try a grading method. This is sometimes the case.

The plowman beds up the land high, in this basin, in the same way that he beds up straight rows of the same distance apart, except that he plows around the basin, and does not stop to turn around at the ditch until he is obliged to do so from the nature of the rows.

SECTION XXIV.

HORIZONTALING A HILL ON THE LEVEL METHOD.—No. 1.

We will now work on the *Peach Tree Hill.** About an acre on the top of this hill is an uneven plain. The hill slopes North, East and South. There is a fence on the South and West, and a ditch on the North and East.

We can commence work almost any where, on the side or top of the hill. For convenience of plowing we will begin on the top, not far from the angle of the fences, and lay off a level row from fence to fence. This is done in the same manner that we did for the basin, moving the level as there, and staking the row for a guide row. When done the plowman begins and plows it out. We test it and find it correct, and nearly straight. We put him to laying off four feet rows by it next to the fence. They become nearly straight before he finishes them. Whilst he is at work there, we step down thirty paces to the brow of the hill, and commence at the west fence and lay off another guide row, which makes a curve as it goes around to the south fence. We examine our stakes, re-set them, and the plowman plows it out. We test it with the level, and correct the errors with the plow.

The plowman, after finishing the first set of rows, has gone on the other side of his guide row, and is laying off by it. We watch and try his work with the level, and see that he keeps his distance. We find directly that the south end of his rows terminate at the fence, and the north ends at the second guide row just laid off, and unless his rows are on a level they will pour the water into this guide row, or by the side of the fence.

When he finishes this work he goes below the second guide row and lays off by that, and we go twenty steps below it, and lay off a third guide row. To do this we find two gullies to cross made on the side of a fence that has been removed.† They have a ridge between them, on which the fence stood.

We call the hoe hands, not far off, shrubbing a ditch bank,‡ and send for a plowman with a turning plow, who is plowing in the first set of straight rows laid off by the eye; before he arrives the hoe hands have nearly filled the gully with shrubs, pieces of rails, turfs of grass, and the like substances, and have them ready for the dirt. The plowman goes up and down the

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* See Fig. 1. Peach Tree Hill.

† Gullies should not be allowed by the side of fences. The fences, if possible, should be placed on level land, even if they are crooked. So should all plantation roads. All gullies should be stopped and filled up several days before the land is horizontalized in order that they may receive a rain or two and settle the dirt in them.

‡ Ditch banks and fence corners should be shrubbed, and all sprouts on the field grubbed up before the horizontaler goes to work, so that his work be not delayed.

ridges, and turns the dirt on and towards the gullies, and the hoes drag it on and fill up the gully with soil, tramping it down hard at the same time. This job done we dismiss them for the present.

Unless there is a good reason to commence laying off this third guide row at the fence, we commence it at the head, or beginning of the gullies, and lay off the row on one side, and then return to the starting place, and lay off on the other side of it. To do this work well we first span the gullies and get the level to start with. We then lay off from the guide stake. We left the plowman on the lower side of the second guide row. When the plowman has laid off five or six rows by the second guide row he lays off this third guide row. As he crosses the gullies he turns up the rows a little, and crosses in a curve, or else after the dirt settles in the gully the water might accumulate in it and make a break. This row is examined for correction, and corrected. The plowman now lays off rows on the upper side of this guide row until his work meets. If there be any short rows they are between the two last guide rows.

We go below thirty paces, and lay off a fourth guide row. This will be sufficient for this hill-side. The plowman lays it off, plows a few rows above it, and then a few rows below the third guide row, to throw the short rows between the two sets of rows. The balance of the rows are laid off by the last guide row. They get shorter and terminate between the angle of the ditches. *

SECTION XXV.

Horizontaling this Hill by the 2d Level Method, with Guard-drains.

If we desired, we could make two guard-drains on this hill-side. One where the second guide-row is, at the brow of the hill, and the other where the fourth guide-row is, at the head of the gullies. We select these places, because the rows are more liable to break at the brow of the hill, and because the gullies have made breaks already. The first guard-drain would have less land to protect than the second, and its dimensions can be less than the second. We would make it ten inches deep, twelve inches wide, with a fall of one inch to the span of the level. The second drain would be twelve inches deep, and eighteen inches wide, and varying from one to three inches fall to the span of the level. To lay off the first one, we would commence at the south fence, at a certain place we desire to discharge the

* See Fig. 1. Peach Tree Hill. This hill was laid off by this method in 1851, and the gullies stopped in two years. As the rows next to the main ditch held water too long in the spring of the year, some of them have been altered so as to give a little fall to them, to empty the water at the fence, and then into the ditch. The hill-side was plowed as deep as one good mule could do it, and it has improved and produces much better than it did the first year with the same management.

water. We might pass it under the fence into my neighbor's field, but as he has no corresponding drain, we let it go down the fence on our side.

We lay it off just as we do a circular row, except we give an inch fall, every span of the level, and turn up the end at the west fence to catch any water that might descend by the side of the fence.

To lay off the second drain, we commence at the head of the gullies, because if we commence at the fence, the drain might not pass them at that point, and to stop all breaks, gullies and washes, we must remove the cause first, and the cause is usually above the commencement, and sometimes some distance to one side of the break. It requires a skilful eye to detect it sometimes. We commence at the gullies and give two inches fall, and proceed to the south fence, and at the fence we give three inches the last span, to prevent the mouth of the drain from choking with trash and sand. We return to the gully, and run the other way to the west fence, and the first span we give one and a half inches fall towards the south fence, then one inch the next span, and continue that fall to the end, and turn it up two inches at the fence. We have a drain row with a fall of from one inch at the west fence to two, and lastly, three inches fall at the other end. The gully by the fence takes the water into the ditch below.

The drains having been laid off and staked, so as to know them, we lay the rows off on a level as above stated for No. 1. Should they break, the guard-drains will arrest the water, and remove it when desired. This will suffice to explain this method.

SECTION XXVI.

Horizontaling this Hill by the Grading Method.—No. 1.

Suppose we desire to lay off this hill with a fall to the rows, without the aid of drains or hill-side ditches, we would commence as we did for the level method, and lay off the top of the hill on a level, as we find it inconvenient to discharge the water up there. Then we would lay off the first guide row at the brow of the hill as was done for the level method, but give a fall of one inch to the span of the level towards the south fence. We would lay off a second guide row, where the third guide row is for the level method, at the head of the gullies, and give the same fall as the one above. One more guide row would be sufficient. In plowing out the rows, the plowman lays off a few rows below the first and then a few above the second guide rows, so that the short rows may be midway between them, if any. Now, if the short rows were to empty the water into any one of the long rows, it would cause that row to wash into a gully. So we plow them on a level. The same disaster would happen if the short rows were to terminate with a fall with a guide row. To avoid that mischief, we lay off long rows by the guide rows, so as to throw the short rows between the long rows as above mentioned.

The balance of the land can be plowed by the third guide row. But we find that they will terminate at the ditch, and there is no provision made for the exit of the water. We have either to lay off a drain by the side of the ditch, or lay off two rows next to the ditch and parallel to it, and make a drain of the water furrow of the second row next to the field. This is the best plan if the land adjoining the ditch is higher than the adjoining land. The graded rows then empty into that furrow, and it is conveyed to the gully by the side of the fence, and from thence into the main ditch.

But should the ditch have too much fall to admit of the above plan, we should have to adopt some other plan to receive the water and to discharge it into the ditch. We should have to plow all the rows in the angle of the ditches on a level, or cut a guard-drain from the point of intersection of the ditch and south fence, to the north ditch, and give two inches fall to it, and empty the rows in the angle of the ditches into it.

SECTION XXVII.

Horizontaling this Hill by the 2nd Grading Method.

We have to lay off the drains, and then the rows with the same fall as that of the drains. Two drains in the same places as those for the level culture would answer. We would discharge the water at the same fence, and with a grade from one to two inches fall and twelve inches deep and fifteen inches wide. The rows are laid off by the drains as above stated. The first rows above and below the drains should be five feet distant to give room for the channel and bank of the drains. All short rows should be between the long ones, and plowed on a level. If they terminated into a long one they would wash it, and if they terminated in the drain below they would fill it up with sand.

SECTION XXVIII.

Horizontaling by the 3rd Grading Method.

The rows by this method must discharge the water into the ditches. We cannot explain it so well here, unless we suppose the main ditches and the gully by the side of the fence to act as substitutes for the hill-side ditches. The drains are laid off as by the preceding method, but with more fall, to convey the water off more speedily. We then run the rows with a fall of one and a half inches into the ditches. Many of them will terminate at the ditches and many elsewhere. The liability to wash the land, and the trouble of discharging the water, would make it objectionable on this hill-side, but the method might answer a better purpose on other places.

SECTION XXIX.

HORIZONTALING BY THE 4th METHOD.

The straight row method could be applied here; and with the protection of hill-side ditches with three inches fall to them, the land would not sustain as much damage as it has done by the same method without the ditches. For hill-side ditches would do for this hill-side, with a fall of from three to five inches, eighteen inches deep, and twenty four wide. They must be capacious, to receive and retain the sand and water. After they are laid off and staked, the plowman sets his stakes, and plows up and down hill. In cultivating, the plowman has to raise his plow over the banks of the ditches as he passes them. This is troublesome, and he is likely to plow down the banks. This method would do much mischief to this hill in a few years, and cause much labor to keep the drains clear, and the banks up. It would be very objectionable to this kind of land.

SECTION XXX.

LAYING OFF GUARD-DRAINS AND HILL-SIDE DITCHES WITH THE RAFTER LEVEL.

A skilful horizontaler can lay off these drains very well, with an Engineer's, and other levels of simple construction, but, as we write more especially for the instruction of new beginners of the art, we shall use the rafter level. We will select the Triangular Ridge, in the same field for operations. It lies north and South, near two hundred yards long, the apex of the triangle being east, and the base west, about one hundred and fifty yards wide. The ridge inclines south, east and west, and the water naturally flows south, south east, and south west. It is bounded on the east by a fence, on the west by a ditch, on the north by a ditch, and on the south by a flat and drain.

We take the level and go on the ridge where the greatest slope south begins, and the greatest expansion east and west takes place, more properly, where the ridge begins to break up, and spread out into the flat, south, west, and east. We set the level across the backbone of the ridge, and find the exact level, and stick a stake down by the side of the plumb line, called the medium stake. We now go east, and place the hind foot by the side of the stake, and move the forefoot until the plumb-line settles at the half inch mark of fall on the graduated bar; we then move the level, and put the hindfoot exactly where the forefoot stood, and move the forefoot until the plumb-line settles at three quarters of an inch fall on the bar; we move it again, and repeat the same movements until we get to two and a half inches fall, and continue that fall to the last span of the level, and give it three inches fall; we finally turn down the level to the corner of the fence to six inches fall, so as to give the drain a sufficient curve to catch the water de-

scending in a gully by the side of the fence, and convey it out without breaking the bank of the ditch. We return then to the medium stake, and proceed exactly in the same way for this part of the drain, as we did for the preceding part, until we get to the wet flat bordering the ditch, and from thence to the ditch we give three inches fall, and turn down the line, so that it may enter the ditch at an acute angle, to keep it from being choked at its mouth.

In laying off this line, we stick a long cane every sixth, and a short one at every third, span of the level. We now lay down the level and examine the line. We find the stakes standing irregularly, some out and some inside of the line, rather zigzag. We re-set them by the eye, and order the plowman to follow us with the scooter plow. We walk from stake to stake, and just ahead of the mule, (who will soon learn to follow,) and leave them for him to knock down and the little boy to pick up. When we reach the end, at the ditch or fence, the plowman waits until we examine, with the level, his furrow, to see if it is correct; if there be any deviations from a correct and regular fall, we mark the places and direct the plowman to run them over. When it is done right, he takes the hill-side plow and retraces the line, throwing the furrow down hill, and thus continues throwing two or three more furrows in the same manner, and the hoe-hands drag out the dirt and form an embankment, making it higher at the fence and ditch, as the danger of its breaking is at those places. The plowman runs two or more furrows in the drain from each end up to the one-inch grade, and stops at that point, as it is deep enough there. When the ditch is finished, it will vary in depth from the medium stake to the ditch and to the fence, from six to eighteen inches deep, and from eighteen to twenty-four inches wide.*

As the wet flat, bordering the ditch the whole length of the ridge, needs draining, and as the land has been cross-plowed, and cut into ruts by the plow and water, we conclude to

SECTION XXXI.

Horizontal it with the Grading Method, No. 3.

with a fall to the rows of one inch to the dry land and three inches to the flat.

We will commence and lay off a guide row where the wet and dry land joins, at the hill-side ditch, and run north to the main ditch. This row is nearly straight. The plowman lays off all the rows by it to the main ditch in the wet land, with the same fall, four feet apart. We go to the medium stake, and lay off a row north, on the backbone of the ridge, and find it

* See Fig. 1, H. S. D. Triangular Ridge.

varies but little from a straight line, and terminates at the north angle of the ridge at the ditch, and give it a fall from that point to the hill-side ditch of one inch to the span of the level. The plowman now lays off the rows on each side of this row by it, to the first guide row and to the fence. We see that it is done correctly, and put in a short row occasionally, to keep the correct and regular grade. In cultivating this ridge, we have had to make a few water furrows across the rows in the wet flat with the plow, to drain it quicker during heavy showers. This is all the trouble we have had with this ridge since it was horizontalized.

SECTION XXXII.

Guard-Drains.

Below this hill-side ditch we have made three guard-drains, two on the east side of the ridge, and one on the west, the first one about fifty yards from the ditch, and the second one thirty yards below that one, both nearly parallel to the ditch. The first one about half the length of the ditch, and the second one not quite so long as the first; both have a grade of from one to three inches, twelve inches deep at the outlet, and six inches deep at the heads, and fourteen inches wide.

The one on the west side of the ridge is in the shape of a capital E, and the lower end of it is a double drain, receiving and discharging the water on both sides of it into the main ditch.

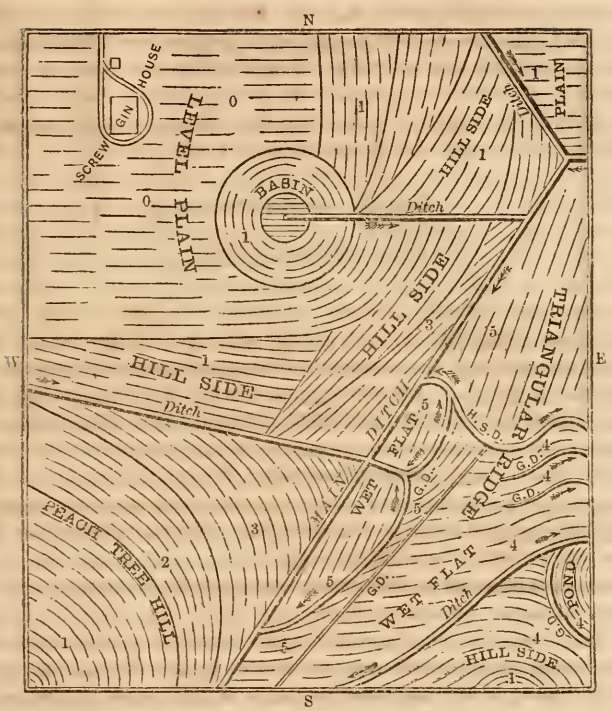
The two first are laid off in the same manner, commencing at the fence and proceeding up into the field.

The third drain we commence at the hill-side ditch, into which the drain discharges at the north end, and curves up and down, and then up and down again, to the main ditch south, and just before it reaches the main ditch it divides into two, separated merely by the bank. The middle of the E connects with a drain that leads to the ditch, making three outlets for this drain, one into the hill-side ditch, and two into the main ditch.

We need not describe the laying off and constructing of guard-drains, as it is the same as for the hill-side ditches.

We might write many more pages on this subject, to illustrate the minutiæ of this beautiful art, but as the *Essay* is already much longer than we desire, we refrain, but will illustrate it by a couple of *figures* for the examination and study of those who take sufficient interest in the art, and hope to make it sufficiently intelligible for the understandings of my readers.

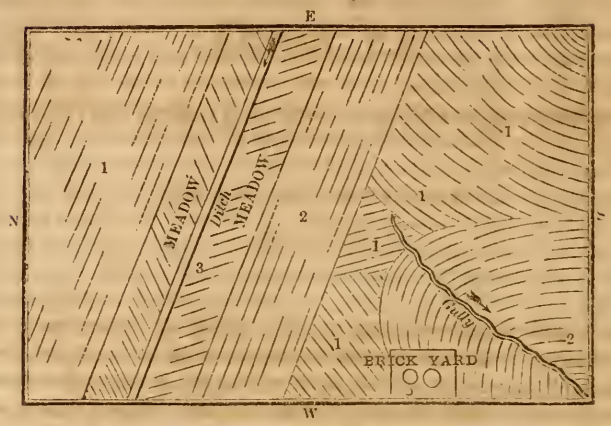
FIG. 1.—GIN HOUSE FIELD, 45 ACRES.



EXPLANATION OF THE FIGURE.

0. Straight rows by the eye.
1. Level Method, ... No. 1.
2. " " ..... " 2.
3. Grading Method, ... " 1.
4. " " ..... " 2.
5. " " ..... " 3.
" " ..... " 4. Not illustrated.

FIG. 2.—BRICK YARD FIELD, 10 ACRES.



EXPLANATION OF THE FIGURE.

1. Level Method, ... No. 1.
2. Grading Method, ... " 1.
3. " " ..... " 2.

The gully was stoped in two years.

AN ESSAY

ON

HORIZONTAL PLOWING AND HILL-SIDE DITCHING.

By Dr. S. G. WARD,

OF WARREN.

Every field the least undulating or hilly, should be ditched and thrown into horizontal beds, regardless of the nature of its soil, not only for the purposes of preventing it and the manures that may be applied, from washing away, and draining the land of redundant and noxious waters, which serve to harden it and hinder the action of the atmosphere from disintegrating and fertilizing the soil, but likewise for the purpose of retaining the light showers of rain, so necessary to production, by thus leveling the rows.

Our country has doubtless sustained more irreparable injury from plowing up and down the hills, and for the want of flues to carry off the superfluous rains, than it has from all the crops which it has produced. It must be apparent to the most superficial observer, that if a proper system of ditching and plowing had been timely adopted, that our lands would have been measurably saved from the galls, gullies and blighted aspect which they present on every side; and that the reclamation of our worn-out fields must be based upon the general adoption of such a system.

The failure of so many to compass this object, owing, doubtless, to their want of correct information, or to their having used an imperfectly made level, have deterred others from the trial, which difficulty we hope to obviate by the following plain rules, which any common-sense farmer can practice:

Hill-side ditches should have sufficient fall, if the inclination of the field will admit of it, to enable the heavy rains to sweep them out, as they are subject to be clogged at all seasons, and as it would be an onerous task on the farmer to keep them open, and they should be wider in proportion to their length, in order to hold and discharge the waters that may accumulate.

Two inches fall for every fifteen feet of the ditch, where it is over two hundred yards long, on clay subsoil or gravel bed, and one and a half inches for porous ones, are safe general rules; but the disposition of some lands to gully, and the level surface of others, necessitate us in such cases to allow less fall, and with impunity, as they absorb more readily.

The rafter-level to be used in the operation, should be made portable, of light but substantial wood, in the form of the Roman capital letter A, fifteen feet in the base, and the cross bar sufficiently high to rest the right arm upon while operating. The centre of the bar is to be ascertained by reversing the feet of the level on an ordinary plane or plank floor, and by marking the bar, with a lead pencil, where the plumb-line touches it at each trial, and the true centre will be found at the point of equal division between said marks; then saw off the foot of the level at fault until the plumb-line rests on the centre mark, after which place a block of half an inch thickness under one foot of the level, and mark the bar with a knife where the plumb-line may touch it when one end is thus raised, and repeat the operation of placing block on block of said thickness, and marking the bar as before directed, until two inches are scribed, which will serve as an index for any desired fall to be given a ditch.

The plumb is such an one as is in general use by the rock-mason, which should be nicely balanced and suspended from the vertical angle of the level by a very small line, reaching only to the bottom of the bar, in order that the wind may the less affect its settling while operating. But by the introduction of a spirit-level in the centre and top edge of the bar, one can operate as well in windy as in calm weather. This mode is greatly preferable on that account, and the cost is but trifling compared with the expension of time and annoyance. The fall is to be indicated by marks on the bar or vial with a file, opposite the edge of the fluid as it changes, by raising one foot of the level with half-inch blocks as before directed.

Thus equipped, the operator may repair to the field, after it has been thoroughly plowed and rolled, or harrowed, accompanied by a boy with a bundle of small sticks of a foot in length, and locate the ditch prospectively as near as he can, with an eye to the order, convenience and safety of the field, by surveying the area from eligible points. It is best to commence the ditch at its mouth's end, which should empty, if practicable, into a stream or gully if not too abrupt, or on a rock or broomsedge, in order to prevent injury to the adjacent land.

Place the foot of the level which is nearest the marks on the bar, at the starting point, and then carry the other leg up the hill-side until the plumb-line or fluid in the vial is opposite the mark desired for the fall of the ditch, and thus proceed up and around the hill to the other side of the field, the boy marking the track by sticking his pegs at the hindmost foot of each step of the level.

Should a shallow gully or valley intervene in the desired course of the ditch, which may be spanned by the instrument, or by a long plank, so as to enable the operator to get the level on the other side, this would be preferable to heading such obstacles, as water does not flow readily around an acute angle, and as the interruption may be filled up with earth and turf, and supported below by rocks or logs. The ditch should cross such places obliquely, in order that the waters that may run down such gorges, should

shoot into the centre of the ditch, instead of striking its bank transversely, in which case it would make a deposit of dirt and soon break over.

And should a ridge or plain interrupt the working of the level, after reaching the altitude of the intended ditch, the feet of the level should be reversed, until the margin of the field on the other side is reached. By this arrangement, the ditch will empty its waters at both ends, which is as desirable as necessary in long ditches, and this plan, in all such cases, should be adopted, and a small space left on such plains, or summits, for the passage of wagons or carts.

When fields are intersected or bounded by streams or deep gullies, the ditches should be made to conduct their waters into them, but the contrary way to those that flow in such channels, as the length of the ditch by this method will be materially shortened,—a desideratum of importance in such cases, as they would be necessarily too long if they carried their waters in the course of such natural channels, having a greater fall than the ditch.

No correct standard can be given for the number of ditches, or their relative distances apart in any given field, as that depends entirely upon the surface, and natural condition of some lands to sob, or become *impact* by the actions of the elements. It therefore must be apparent that a field having steep hill sides would require twice, or thrice as many ditches to preserve it from wash, as one of the same dimensions that is comparatively level.

Their number and distances apart must therefore be left in a great degree to the judgment of some one of experience, provided his experience has taught him to rather err in having too many, than too few ditches on abrupt hill-sides. Fifteen or twenty yards apart in such cases would not be too close; and if the ditches are long, two and one-half inches to fifteen feet would here be an advisable fall. Ditches should be located at the upper edge of washes, and rails thrown into them when crossed by a vehicle, provided they are timely removed. Should a ditch be disposed to wash too deep, it may be remedied by casting in small stones, or green pine brush at the mouth, and along its course if necessary, at intervals apart. A ditch over two hundred yards long should be at least three feet wide in the last quarter, to be thrown out with some approved hill-side plow, whose mould board can be removed at each end of the ditch.

The number of rows will be governed by the length of the ditch, but in every case there should be one or more short ones added, nearest the mouth's end, to widen it there. The loose dirt should be pulled out with wide hoes on the lower side of the ditches, and formed into an oval bank, clear of roots and grass, which form is least subject to fall into the ditch from the effect of frost or any other cause. The land should be very moist when the work is done, to insure a firm bank. The plow will give a good standard for the depth of the ditch on the upper side; next to the bank it should be deeper, that the subsoil beneath the bank may prevent it from being undermined. Fields should be ditched the second year after they

shall have been cleared; as they can never be horizontalized so correctly after the surface is broken by rains.

After having ditched a field as near parallel to each other as the nature of the land will admit of, then run the rows for the beds perfectly horizontal, by which arrangement it will be perceived at once, that a number of the rows will cross, or rather empty into the upper side of each ditch, nearest their mouth's ends, in as much as the ditches have a fall of 2 inches to every 15 feet, and the rows being level. Such rows will empty themselves readily of superfluous water; and retain every light shower, which is greatly preferable to the custom which generally obtains of running the rows parallel to the ditches, in which case they are worse than a nuisance; as each row takes off its own water, having as they do the fall of the ditch, and will soon form a deposite of the soil where they end. If "whatever is worth doing, is worth doing well," is a received maxim in farming, it should certainly be carried out in horizontalizing land, as it is permanent when well done; and as the least deviation from this rule may require more time and labor to repair the damage that may be sustained by wash, than would be expended in levelling the land properly. The level should therefore be used to horizontalize a few parallel rows between each ditch, at such distances from each other as to give a general outline of the levels in the spaces to be filled up. Tobacco lots subject to sob, may have an inclination of ½ or ¾ of an inch in 15 feet of each row.

A bull-tongue plow should follow and mark the track of the level, and parallel rows should then be thrown in between, with said plow, on both sides of each row thus leveled at the distance of ten or twelve feet apart; which may be easily regulated by a boy walking in said leveled furrows, directly opposite the horse's head, with a ten feet rod in his hand, so attached to the bit of the bridle as to guide the horse. The remaining space will then be easily filled up by the eye, with parallel rows of width to suit the intended crop, and short gores or rows thrown in to fill out knobs which may be presented by the inequality of the surface.

The field thus ribbed may be aptly compared to the frame of a bulged-side basket. The union of the rows with the ditches, and with each other should describe an acute angle, instead of uniting in a circular form, as there would be, in the last case, an unappropriated space left at the end of the rows. The identity of the rows may be indefinitely preserved by plowing out one or two rows only, at a time in fallowing the land from year to year, instead of flushing all the space between the ditches in one land, which practice creates a bank on the upper side of the ditch, much to the hindrance of the escape of the waters.

The mode of thus bedding the land in the Fall, as suggested, is the best possible manner in which it can be left for freezing and absorbing the atmospheric gasses, and as equally well adapted to the growth of the cereals, for the numerous water furrows will serve to drain the land during winter and spring; nor is such an arrangement objectionable in reaping the grain.

The necessarily lengthened detail of this Essay, together with your limited time, forbid farther enlargement upon this fruitful and all-important subject to the welfare of our beloved State; but we feel confidently assured that if our imperfect suggestions are fully carried out, that the value and production of our lands will be greatly enhanced, and emigration eventually stopped.

In conclusion, we beg leave to inform the Committee that the plan herewith submitted for their adoption, is not theoretical, but one whose practical utility has been demonstrated on a liberal scale for the last twenty years, by your candidate for the premium, and substantiated by the accompanying certificate from one of our most enterprising, successful, and intelligent farmers.

Respectfully submitted,

S. G. WARD.

October 19th, 1857.

CERTIFICATE.

This is to certify that I purchased the farm on which I now reside, from Dr. S. G Ward, in 1849, who thoroughly ditched and horizontalized the hill-sides, which are numerous, lying as the land does, in the angle of Flat and Shocco Creeks, and have deemed them so perfectly adapted to draught and prevention of washing, that I have made no alterations in any one of them.

JOSEPH S. JONES.

Oct. 19th, 1857.

AN ESSAY

ON

HILL-SIDE DITCHING AND HORIZONTAL CULTURE.

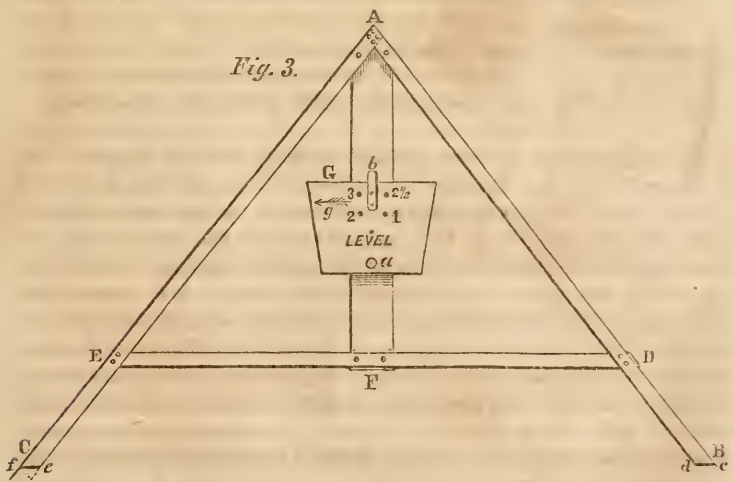
By "EDGECOMBE."

[This "Essay" is written in the form of a letter, so as to explain the subject in more familiar and conversational terms. Having to describe my system of Hill-Side Ditching as well as Horizontal Culture in one essay, it is necessarily long.]

TARBORO', Oct. 1st, 1857.

RESPECTED FRIEND: Before you can begin a system of hill-side ditching* and horizontal culture, you must make an instrument for ascertaining the

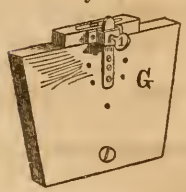
Fig. 3.



* To be within the bounds of the premium, I have used in this "Essay" the term *hill-side ditch*, but I mean rather a kind of hill-side *dam* than ditch, as we commonly conceive a ditch to be; nevertheless, my idea will be conveyed if the directions I have given for finishing off the ditch be noticed, for the following them makes the very thing I mean.

fall you wish your ditches and rows to have; therefore, procure two slats, A B and A C, (Fig. 3,) about 7½ feet long, 3 inches wide, ¾ inch thick; one slat, D E, about 7 feet 5 inches long, 3 inches wide, ¾ inch thick; one slat, A F, about 3 feet 7½ inches long, 3 inches wide, ¾ inch thick; and a piece of plank, G, 9 inches long, 8 inches wide, ¾ inch thick. Let the ends of A B and A C into each other, as at A, on the ground, at the same time stretching the ends B and C so as to measure ten feet from *c* to *e*; then fasten the ends at A securely with nails or screws. About two feet from B and C, let the ends of the slat D E into A B, and A C at D and E, fastening them securely. Now beneath the triangle D A E fasten the slat A F at A and at F, being midway under D E, merely screwing or nailing the ends without letting them in. About the middle of A F fasten on the piece of plank G, with the screw *a* so as to *revolve tightly* about the same.* Attach a small strip, *b*, about ⅛ inch thick, ½ inch wide, and 2½ inches long, to G, as at *b*, so as to extend about an inch above the edge of G. Saw off the ends B C with the lines *c d* and *f e*, so that your instrument, when standing, will be firm upon the ground. Raise your instrument upon its feet, and you have the "Rafter Level," yet to be made complete by adding the "Spirit Level," which I have attempted to represent, resting upon the plank G, by Fig. 4; it is a small glass tube in a cast iron case about 3 inches long and ¾ inch thick, which can be had at any store that deals in hardware. You now fasten this, or any other spirit level, upon the upper edge of G, by passing the strip *b* through a projection on the side of the spirit level, tightening it to the strip *b*, with a thumb screw in the projection, marked 1, (Fig. 4.)

Fig. 4.



Your instrument being now put together, with the spirit level attached, place each foot, B and C, on some hard ground or floor, as near upon a level as your eye can determine, at the same time moving the plank G about the screw until the air bubble stands in the centre of the spirit level; then reverse the ends B and C and examine the air bubble; if it stands in the same place, your instrument will show an exact level; if not, move one foot up or down, as the case may be, at the same time the plank G, bringing the bubble again to the middle, change ends as before, which done, look at the bubble; if in the centre, all right; if not, continue the process as above, until it does stand in the centre.† Now mark the spots on the floor or ground where stand the feet B and C; and keeping the plank exactly as when you found the level, bore a tenpenny hole, or larger if you

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* The upper edge of this plank must be perfectly straight and smooth.

† Remember to keep your instrument as nearly perpendicular as possible during these trials.

like, through G and the slat A F, marking it with the word "*level*," as on G, (Fig. 3.)

Now standing with your face fronting the side of your rafter level, upon which G is fastened, mark the left end of G with an arrow, as at *g*, which end must go forward whenever you run with the fall. Now both feet being exactly in the spots as marked above, place an inch block under the right hand end, B; this done move the plank G about the screw until the bubble stands in the centre, then, keeping the plank tight as before, bore another hole, marking it 1, (for one inch fall,) as at 1 on G. Proceed in this manner with 1½, 2, 2½ inch blocks, until you reach three inches fall. Lastly, after marking each hole with the name of its respective fall, make a little peg to fit the holes, so that when passing through G and A F it will hold G at whatever *fall* you wish.

Your instrument is now complete for operation. Take it to the field you wish to protect, having the peg in the hole marked "*level;*" carry with you a small boy, having a common weeding hoe. Find, as near as your eye can determine, the highest point of the whole field, if it is sloping or hilly; but if part level, go to such a point as will take in most of the inclination. And here I tell you, at the outset, I or any other man can only give general rules, (you must determine by your own judgment when, where, and how to apply them,) which I now give, before you begin to operate, reserving a few special rules to be explained when we come to making the ditches, as they are only to be applied according to circumstances:

GENERAL RULES.

1. All ditches, if possible, should empty their water down the natural drains of the country.

2. The head ditch should be so located as to divide the sloping portion of the field from the level.

3. Where a ditch can, it should be emptied both right and left, and so located as to divide the water as near as possible.

4. A ditch should be so located as to receive the *water* before it gets much *momentum*.

5. Therefore all *steep* hill-sides should have their ditches nearer together than those less inclined.

6. Whenever the water is discovered to begin to wash or run, or collect much, there the ditch should begin or run *above*, and not *below* such places, as some have contended.*

7. A ditch should *increase* in fall at *regular intervals* from its head to its mouth, which fall must be in proportion to the *texture* of the soil and the quantity of water to be carried off.

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* For a ditch is to keep just such spots from washing any more, and what good can a ditch do after the water has passed over them?

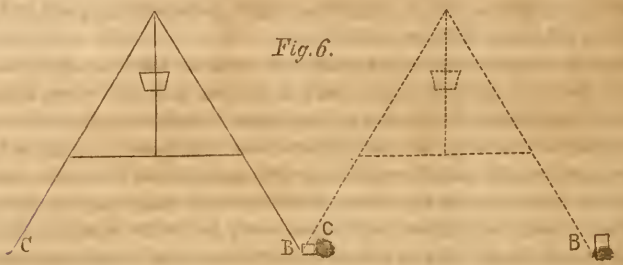
8. A ditch should never be less than three and a half feet wide, for the *smallest* quantity, and increase in width as the water increases.

9. In using the rafter-level, it works best on fields that have been in some broad-cast crop, but never stop for old corn or cotton ridges.

Besides these general rules, there are some specific improvements, of my own, to be added according to circumstances, which I shall describe when we come to finish off the ditches.

Keeping these general rules in view, determine for yourself where best to begin your ditch, which being done, there place the right hand foot of your rafter-level, (say for instance) dotted B, Fig. 6; order your boy to dig a

Fig. 6.



hole* as at dotted B, just at the end of the foot B. Move the foot C up or down until the bubble stands in the centre; you now have the exact level from B to C; now mark the spot of C, by giving the rafter-level a gentle push on the ground, then move on your instrument and place B upon the spot where stood C; this done, order your boy to dig at B, as before at dotted B, which he can do while you arrange the level.

Proceed as above as far as you wish your ditch to run level, then pull the little peg out of the hole marked "level," (Fig. 3,) and put it in the hole marked 1, moving the foot C as before, until the bubble stands in the centre, when you will have an *inch fall* in ten feet, that is from B to C. You now see how much more convenient the moveable plank is than taking off or putting on blocks at foot C, as others have recommended. You now proceed in this manner until your line of ditch is run out, increasing the fall at such intervals as you like, by putting the peg in the proper hole. If you wish your ditch to empty its water at both ends, you can return to the beginning and run to the left or right, as the case may be, in the same manner as before.

After you have located the line of your ditch as above described the holes

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* Remind him to pile the dirt up well on the edge of the holes as at 1, 2, Fig. 5, so as easily to be seen when you come to plan out the ditch.

Fig. 5.

will appear, in relation to each other as those in Fig. 7, when the ditch

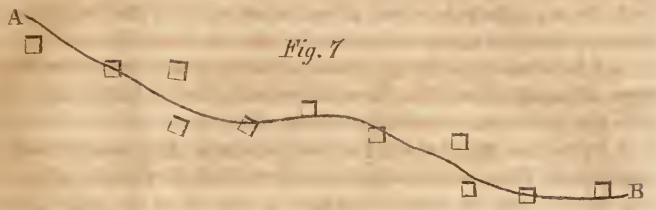


Fig. 7

should run as the line A B. Now, with a good turning plow and horse, and an able plow hand to hold the plow steady, go to that end of the ditch where the mould-board of the plow will be down the hill; then taking the horse yourself, with one hand close to the bit, lead him along the general line of your chops, as the line A B, ordering the plow hand to hold the plow so as to run close in the horse's hindmost tracks, and so on to the end. The plower now returns, without plowing, to where he began, then runs another furrow in the one first made as deep as possible, you following this time, without holding the horse, to alter any points made wrong in the first furrow. After this is run out, the plower again returns to his beginning; this time he must cut a furrow slice as wide as the plow will make, on the upper side of the first, and throw it directly into the first; this he continues on the upper side of each, until he has cut furrow slices enough to make the width you wish your ditch, say from three to five slices.

Your ditch is now ready to be cleaned out, which is best and quickest done with long handle shovels, such as are used by ditchers. If you have no shovels take weeding hoes and begin at the lower end, and rake or throw out the dirt of the furrow slices to the first furrow, throwing it on the lower side of the same, making your ditch at least as wide as all the furrows run by the plow.

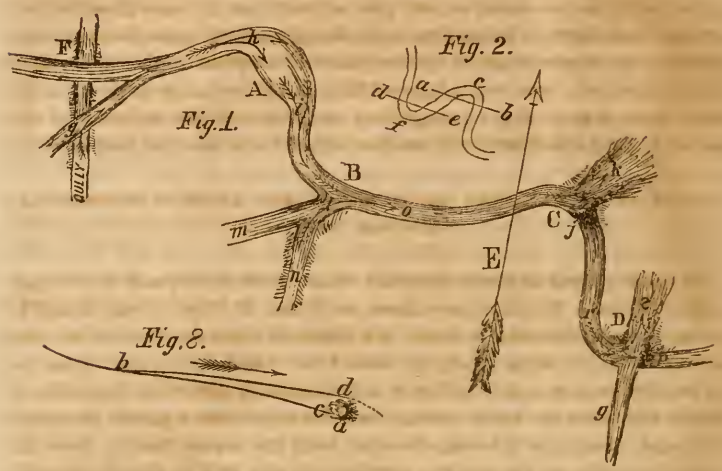
PASSING UNDER FENCES.

If your ditch empties through the fence, open it well directly under the fence.

CROSSING DEPRESSIONS AND PROJECTIONS.

Where the ditch crosses depressions in the hill-side, form the ditch well *up* the hill, also where it crosses a projection in the hill-side, form the ditch well *down* the hill; for the rafter-level in crossing a depression will step as the line *a b*, Fig. 2, where the true line is *a c b*, and in passing over a pro-

jection will follow the line *d e* when the true line is *d f e*. Make the bank high at the depressions and the ditch deep at the projections.



PASSING STUMPS AND TREES.

On coming to stumps and trees, if small, take them up, if large, by beginning high enough up the ditch you can force it enough up hill to pass above them. For instance, let *a*, Fig. 8, be a stump or tree and *b c* the right line of the ditch, by forcing the ditch up a little from *b*, it will run above the tree as *b d*, thereby throwing the tree *a* into the ditch bank, giving it a fine support.

PASSING GULLIES.

In passing a gully, just where the *ditche's bank* will cross, it must be filed up with logs or trash nearly even with the general surface; then fill the bottom of the gully even with the bottom of the ditch, with dirt from the sides of the gully just above the ditch, making the ditch bank upon the trash with the dirt out of the ditch above and below the gully. Now cut a *small ditch* as *g* (Fig. 1,) *diagonally* across the gully, so that the water may take the direction of the arrow. If the gully is very deep, you must *head* it with the *small ditch* or the main ditch, so as to let no water get into the gully, then haul trash and fill the whole gully as well as you can.

SUDDEN BENDS.

Whenever your ditch *bends suddenly* as at A and C (Fig. 1,) be sure to

make it *broad* at such *bends*, and *widen* it *well* as at A, so that the water may *spread* as the *double arrow h* over a *large surface* and come together again *gently* as the *double arrow i;* for as water acts in every direction, and presses *downward* in proportion to its *height*, and as these *forces* are here added to its *mommentum*, if it is not allowed to spread and thereby spend its accumulated force over a large surface, it will certainly undermine the ditch bank as at C (Fig. 1,) and, filling the ditch with the undermined dirt as *j* at C, take the direction of the bent arrow *k* and ruin the land below.*

PASSING DEPRESSIONS WHERE THE WATER COLLECTS AND RUNS PERPENDICULAR INTO THE DITCH.

In passing spots as above described where water is disposed to run perpendicular into the ditch, as shown at B and D (Fig. 1,) care should be taken to cause the water to enter in a direction *down* the ditch as the bent arrow *l* at B. To effect which, cut what I call "*bastard ditches*," from five to ten feet long, as *g* at F and as *m* at B diagonally across the depression *n*, which will cause the water coming down the depression *n* to take the course of *l*, and meeting in the same direction with the water flowing down the ditch, proceeds as the arrow *o*, carrying the dirt with it, thereby preventing any daming, which, without the "*bastard ditch*" will certainly take place as *p* at D; for the water coming down *q* at D must bluff against the water of the ditch *r* at D, causing it to take the direction of the arrow *s* washing away the bank and carrying every thing before it, doing more harm than if the ditch had never been made.

If ever necessary to empty one ditch into another, especially if at about right angles, be certain to widen them well at the fork.

I have now furnished all the specific directions necessary in finishing off your ditch, which you see by this time are only to be applied according to circumstances.

You now wish some information how to run your rows, but before I give this let me say, always study to have your ditches *wide* rather than deep, for it is *deep* water that *washes;* and widen them if possible as they approach the emptying point. See with your own eye the first and finishing stroke put to them. Your ditches should be not more than *fifty* nor less than *ten* yards apart, according to the hill; the specific distance you must determine by your own sense, assisted by the general rules above given.

And as it has been suggested to me by a good farmer, your lands where the ditches are, had better rest one year, after they are ready, or be put in small grain so as to get firm.

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* The large arrow E gives the inclination of the hill-side which I could not represent upon a flat surface.

HORIZONTAL CULTURE.

It is my opinion, based upon my experience, that, a practical system of horizontal culture can not be practically attained and used in our climate, for our rains are too sudden and too large to be retained long enough by the rows, to be absorbed. Again, it is impossible to get every row upon a perfect level, owing to the unevenness of the ground and the stumps; therefore, the water will collect in spots, and breaking, cause more damage than without the rows. Again, where you have a system of hill-side ditches, you are compelled to plow across your ditches. And again, in the winter, as the ground becomes frozen by not stirring with the plow, and full of water, all the rain that falls, evidently must run off the surface; then unless each row can in a measure carry off its own water, they run over and wash!

For the above reasons I prefer, after running my hill-side ditches, to run my rows with the same fall, and with the ditches, which is done conveniently, (if you have no plow hand that can run them by guess,) by tying one end of a stick of the length you wish the *width* of your rows, beneath the bit at the horse's mouth, so as to be turned from one side of the horse to the other without hurting him. A little boy takes the other end and walks in the ditch, holding off the horse the length of the stick, while the plow hand holds the plow so as to run with the horse's hindmost tracks. Finishing this row the whole length of the ditch, the boy now turns the stick to the opposite side of the horse, as the plower turns him around, and walks back in the plow furrow as he did in the ditch. This process the boy and plower continue until the rows are all laid off down to the next ditch, with which they begin as before, &c.

PROPER SIDE TO BEGIN ROWS.

Bear in mind always to begin to lay off rows on the lower side of your ditch; for the rows will all point down and empty into the ditch below as at *b* and *c* (Fig. 9,) whereas if you begin on the upper side, a great many of them will run their ends against the bank of the upper ditch as *d* & *e*.

Fig. 9

The advantages of running with ditches, instead of horizontal, are, first, that each row will generally carry off its own water; and the water, running with so gentle a fall, will have time in an ordinary rain to be absorbed; secondly, you never have to plow across your ditches, which evidently would tear down the banks and fill them up, causing a great deal of trouble to keep them in order.

CONCLUSION.

In connection with running your rows with the ditches, be certain to do *deep plowing* in breaking up your lands for the crops.

Always count your *ditch-bank* a row, and *plant* it, so that in working this row you will clear out the ditch.

Never allow any chunks or trash to be thrown or remain in the ditches. At the laying by of your crop, be sure that all your ditches are well *cleaned* out, for it is the winter rains that wash worse.

Be certain to give your ditches plenty of fall. Moles will sometimes undermine the bank, and their tracks must be watched and obliterated.

OBJECTIONS TO HILL-SIDE DITCHES AND HORIZONTAL CULTURE.

The objections that have been urged against systems of hill-side ditching and horizontal culture are,

First. Losing ground by the ditches.

Ans. Which is not the case if you plant the banks.

Secondly. Losing time with the short rows.

Ans. In my system there are so many longer rows by running them with the ditches, that the time in plowing an acre amounts to the same.

Thirdly. That it is harder work plowing a crooked row than a straight one.

Ans. This I admit, for the continuous changing of the line of draft increases the labor; but there is a compensation in the fact that your horse has nearly a *level* on which to walk instead of pulling up and down hill.

Fourthly. That you cannot cultivate a crooked row as well with a plow, as a straight one.

Ans. This I also admit; and I admit that a crooked row is a disagreeable necessity; for who would have one if he could have one that is straight, and at the same time could save and improve his land?

Fifthly, and most serious. That the ditches and rows seldom succeed.

Ans. There are some conditions under which all things human fail. Nor do I claim for my system infallibility; but I say by using the rafter-level above explained, with the *movcable plank* for the spirit-level, (which I claim as my own improvement,) and adding to the ditch the *bastard ditches* at the depressions and the widening at the sudden bends, (which I also claim as my improvements,) and carrying out all my directions, my system will

carry off all ordinary rains without injury, and also all extraordinary rains, on all kinds of soil, better than any I ever tried; and I have tried all that I ever read or heard of.

Lastly, sir, let me say that what I have written is from the experience of seven years, and I have the whole system as above described in operation upon my little farm. Fig. 1 is a drawing of a part of one of my ditches, and Fig. 9 of my hill-side rows.

With respect,
EDGECOMBE.

P. S. I now make this proposition to all who may compete for this premium: that the system set forth in each Essay be tested two years by the Society or Judges on the Essays, in any manner they think best, before the premium is awarded.

LETTERS

ON

HORIZONTAL PLOWING AND HILL-SIDE DITCHING.

By J. W. NORWOOD, Esq.,

OF ORANGE.

[No 1.]

To the Hon. Thomas Ruffin,
President of the North-Carolina Agricultural Society:

Hillsborough, Oct. 20, 1857.

Dear Sir: Observing that the executive Committee in presenting subjects for agricultural essays at the approaching annual Fair, have given especial prominence to "Horizontal Ploughing and Hill-side Ditching," I propose in two familiar letters addressed to you, to be laid before the appropriate committee, to give you my views on that subject.

And I think I may be excused for doing so, not only because of the importance of the subject to the agricultural interests of the State, but more particularly because, for many years I have myself practised this mode of cultivation, with perfect success. I am writing therefore what I know, and am not offering speculations merely.

The evil to be remedied, waste of soil from washing rains, in my view cannot easily be exaggerated. Considering the quantity of improved lands within the bounds of North Carolina, we may suppose as the lowest estimate, that two millions of acres of *rolling lands*, have been cultivated the present year, *every acre* of which was subject to waste from heavy rains, because the rains fell faster than the ground could absorb them, and the surplus water in running off, carried a portion of the soil with it, and if half this quantity of land has been cultivated in corn, cotton and tobacco, and the other half in small grain, we will probably be below the mark in putting down the loss from this cause, to the land owners of our State, for this one year, at an average of fifty cent per acre, or one million of dollars for the whole.

Ask each land owner, how much have your lands been damaged this year by washing rains? and believe me sir, the answer in the mighty aggregate would make a fearful development.

Cast your eye over the State of North Carolina, and say how much the State has already lost, in millions of acres, of once fertile land, now sterile and desolate from this cause: Make up the mournful estimate of the other thousands of acres, which are being annually added to this dreary waste; and then tell me if that system can well be over valued, which will stay this mighty destruction?

But can any art in ploughing effect this grand object—can land be so cultivated as not to wash? To question that fact, would be to stultify man, and impugn the wisdom of God.

This earth has been provided for the abode and sustenance of man, through all his generations, and in all time to come. But to carry out this design of Providence, the fertility of the soil must be preserved and increased. And if those who succeed us, are to go on destroying the soil by their mode of cultivation, in the same ratio as the present and the past generation have done, how are our lands to support the teeming millions of population, which are destined hereafter to possess them?

Land *can be so cultivated* as to prevent washing by two modes:

First, by deep ploughing, let the land be ploughed, say 8 inches or more with a *suitable plow*, I mean one which will turn the furrow not bottom upwards, but only partially over, and thus leave the soil on the top and the clay still at the bottom; and let this plow be followed in the same furrow by a subsoil plow, loosening the land 10 or more inches deep without turning up the clay at all, and you will have your land broken 18 inches deep; and lands thus prepared will absorb the heaviest rains as they fall, and there will be no wash, because there will be no surplus water to run off.

But this plan, it must be admitted, is suited rather to large than to small cultivations. For each of these plows must be drawn by at least three horses. That is to say, each furrow costs the labour of two men and six horses, and the large mass of our farmers have not this force at their command.

Again, upon much of our land this plan is impracticable, because the subsoil is full of stones, and upon the whole, our system of agriculture is not perhaps sufficiently advanced, to warrant the expectation that this system of cultivation will be generally adopted.

Secondly, the same object may be effected by Horizontal plowing assisted by hill-side ditching.

It is the aim of this system, to have the land broken up in beds, parallel to each other, and upon a perfect level, with deep water furrows between them, and that this state of things shall be preserved throughout the cultivation of the crop. This system promises the following, among other advantages:

1, And greatest of all, land thus prepared and cultivated will not wash, because every two sides with the water furrow between them, form *a great trough*, upon a dead level sufficient to hold all the rains ordinally as they fall. There is therefore no wash when the water falls; there it remains and is drank in by the earth. But if the beds shall chance to be broken, by one

of these immense falls of sudden rain which do sometimes happen, or from defective work, then the hill-side ditches are intended to receive and carry off the surplus water, and thereby prevent mischief from washing.

2. By this mode of cultivation, you secure for your crops the full benefit of all the rains sent upon them by a beneficent Providence. Whereas, by the ordinary mode of plowing half the water is allowed to run off the field, carrying the very best of the precious soil with it, and then complaint is made of dry seasons and short crops.

3. All the rains being thus preserved without washing or breaking the land, it will remain *loose* and light through the season.

4. The horses in plowing, being always upon a level, perform their work with more ease and in a more perfect manner, than they can do, when tugging up and down hills in the common way.

5. And lastly, preserve your soil by this system of cultivation, thus laying a secure and proper foundation for all other improvements, and you will have the comfortable reflection of knowing that your lands will descend to the next generation, not worse, but better than when they came to your hands.

In this letter I have studied brevity, and have therefore omitted many things which might properly have been said. In my next, I propose to give particular instructions for this mode of plowing.

With great esteem,

Your obedient servant,

J. W. NORWOOD.

[No. 2.]

To the Hon. Thomas Ruffin,
President of the North-Carolina Agricultural Society:

HILLSBOROUGH, Oct. 21st, 1857.

DEAR SIR: You were, I think, the first man who introduced Horizontal Ploughing into North-Carolina, but without, perhaps, the protection at first of the Hill-side Ditches. I was taught by you, and have now for more than twenty years practised the precise mode which I am about to describe; and I here declare, that when the work has been properly done, I have never been disappointed in my expectations from it.

In the directions which I am about to give, I have mainly followed Captain Hardwick, of Georgia, whose elaborate and admirable essays on this subject were published in the "Cultivator" in the summer of 1855.

THE LEVEL.

The level or instrnment is the first thing to be considered. The one which I use is called the Rafter-Level, and is of the simplest kind. It is of heart poplar, half inch thick and four inches wide, the pieces being about eight feet long; they are let into each other and well screwed together at top, at such an angle that the other two ends or feet are twelve feet apart, —these ends are sawed off square, so that they will stand even upon the ground; a cross-bar of the same sort of plank is then secured from one side to the other across the middle, and the frame of the instrument is made.

You will now fasten a plumb-line to the top of it exactly, and placing the feet of the instrument on an even piece of ground, you will drop the plumb and mark where the line crosses the cross-bar, then exactly reverse the feet of the instrument accurately, and drop the plumb again, and mark where the line crosses the cross-bar, and the exact center between these two points gives you the true level, which you will mark permanently with a knife or saw. Or, go to a carpenter's bench and get him to adjust a plank twelve feet long, on a perfect level with his spirit-level, and place your instrument upon it and drop the plumb as before, and where the line crosses the cross-bar, gives the true level, which you will mark as such.

THE GRADE.

Then, in order to get the different grades which you will need in making hill-side ditches, get four bits of wood one inch thick, and placing your instrument on an exact level, put one piece under the foot next to you, and dropping the plumb mark plainly with a knife or saw where the line crosses the cross-bar, then perform the same operation with two, three, and four pieces at a time in succession, and you will have a scale of grades from one to four inches in twelve feet, which you will find sufficient for all purposes. It would be better, however, to have a spirit-level properly attached to the instrument, especially would it work better in windy weather.

HILL-SIDE DITCHES.

The hill-side ditches are first to be made. Their object is to receive and carry out of the field or to some branch, ravine, or proper receptacle within the field, the water which may happen to break over the beds at the time of an extraordinary rain, or to carry off all the surplus water when the field is in small grain, and the beds have been broken down and the ground levelled.

In constructing these ditches, the operator will take his level, accompanied by a boy and his hoe, and proceed to the highest part of the field which is to be broken up, and just where it is perceived that the water begins to collect and a wash is likely to be made, he will locate a ditch. This

is done by putting down your level and moving the foot from you either up or down, as may be required, until the plumb-line shall fall upon the grade of two inches, or such other grade as you may intend to give, and then you move the level forward, putting the hinder foot exactly in the track of the foremost foot, and fix the grade in the same way, and so on until the whole line of the ditch is marked out across the field, the boy with his hoe making a chop in the ground at the forward end of the level every time it is taken up. Care must be taken not to diminish the grade in this line of the ditch, because if the grade is materially lessened the flow of water in the ditch will be checked, which may accumulate, break over and do much damage.

A ploughman then follows, and runs a furrow along the line of the ditch by the chops, while they are fresh and easily to be seen.

The operator then moves down the hill from thirty to seventy yards, more or less, according to the slope and undulations of the land, and marks out the line for another ditch, in the same manner, and so on until all the ditches are located. The ditches are then ploughed out the desired breadth and depth, and the dirt is drawn out with hoes to the lower side, so as to form banks for the ditches.

THE BEDS.

The ditches being finished, the next thing to be done is to lay off the field in parallel beds for cultivation. And here, again, the operator proceeds with his level, boy and hoe, to the highest part of his field, and just above the spot where a wash is likely to begin, he commences on the side of his field or other convenient starting place, and makes a line as before, with the exception that now a perfect level is to be preserved, which is to be done by moving the forward end of the instrument up or down, as the case may require, until the plumb-line strikes the level mark, and in proceeding be sure always to put the hinder foot of the level precisely in the track from which the foremost foot was just taken. This line when finished, is also to be marked out by a plough following as before; then descend the hill or slope from twenty to fifty yards, more or less, as the nature of the ground may require, and form another furrow in the same way, and so on until the field is laid off. These furrows cross the hill-side ditches wherever they reach them. These furrows are called *guide furrows*, because by them the beds are to be formed.

The field is now ready to be ploughed into beds. These beds are to be as wide apart as the owner may like, and in making them a good turning plough must be used, which must run as deep as the soil will allow, going down to the clay. The work is best done by commencing on the lower side of one guide furrow and ploughing down half way to the guide furrow next below it, and then by moving the plough down to that guide furrow and ploughing upwards from it until the ploughing in the other direction is

reached. The object of this is to equalize the variation from a perfect level which will exist in the space between the guide furrows in most fields, occasioned by the inequality of the land, or the unequal undulations of the land. And it will be found that the furrows thus run on each side of the guide furrow, and starting parallel with them, will somewhat vary from a perfect level, and actually meet at one or more points, leaving pieces of the land between them not broken up. These spaces are to be broken up by *short beds*, which will commence on the side which seems most level. The field is now ready for planting and cultivation.

GENERAL REMARKS.

1. In laying out the hill-side ditches, it is important not to have them too long, but to empty them as soon as you conveniently can; and on that account it is much better usually not to run them entirely across the field, but to begin about the middle of the slope to be laid off, and run them from that as a center line up and down the field out to each side; and in doing that, it is best again to make the ditches lap at the starting place, leaving a space of twelve feet or more between their beginning points, which will enable you to haul your manure into the field and your crops out of it without crossing the ditches.

2. I have always turned, in breaking up the land, at the ditches. A man who attends to his own business and has it done right, may pass over most of them. And in bedding up the field, turn rows must be fixed at such points as are most convenient, being controlled by the nature of the ground.

3. No invariable rule can be given for the grade of the ditches or their width or depth. The good sense, judgment, and experience of the farmer must determine these points. They must be large enough and have descent enough to receive and carry off all the water which will flow into them in case of the beds above them breaking. On my land, which is a red clay soil, free from sand, and therefore porous and absorbent, a grade of two inches to the twelve feet, and from ten to twelve inches deep and twenty to thirty inches wide, answers the purpose for the ditches; the bank on the lower side of the ditch being carefully preserved unbroken. If the ditches have too much descent, the danger is that they will wash into gullies; if too little, the water may accumulate in them and break over. These are the extremes to be avoided.

4. According to my experience, the time of greatest danger to your field in this mode of cultivation, is at the first working of the crop, for then the beds are necessarily broken down in a great measure. If just at this period a very great rain shall fall, you will probably be injured some; but even then not so much as if your field was ploughed up and down hill, because all the furrows are still upon a level, and the water does not accumulate to a ruinous extent at any one point; and the danger will usually be avoided entirely by carefully cleaning out the water furrows at this working. And

the period is of short duration, for at the next working the dirt is thrown back again and the beds restored.

5. Now, sir, I am aware that many persons object to this system of cultivation, out and out, and say in round terms that it will not answer. Of such persons, I am inclined to think that few have ever really given it a *fair trial.* They have not practised the mode here laid down. They have used an *imperfect instrument* in leveling their lands, or have tried to do it by *the eye*, without a level at all, or they have endeavored to make *each water furrow carry off its own surplus water*, or empty it into the ditches by giving the beds, water furrows and ditches all the same uniform descending grade.

All these expedients have failed, because in ninety-nine cases out of one hundred, in a field of any extent, the surface of the ground is too unequal to allow any of these modes, especially the last, to be performed with accuracy and perfection. Let all such objectors first try Horizontal Ploughing and Hill-side Ditching as here described, and afterwards give their judgment upon it.

CONCLUSION.

No single year can, perhaps, be remembered, when land in North-Carolina has suffered from washing rains more generally or more immensely than during the present year. The present year has furnished the severest test of the efficacy of this mode of cultivation that I have ever known; there was especially just in this vicinity, on the night of the 3d of May, an immense fall of rain, which produced greater ruin than I have witnessed from a single rain at any time within twenty years; and this was followed through the season by several other terribly washing rains, and yet my ploughing stood the whole without injury. Full fifty acres of my cornfield was land so rolling, that there is not a spot in it from which the descent, in the direction of the greatest descent, is not ten feet in one hundred yards. It was broken up in the fall and winter, five and a half inches deep, in beds five and a half feet apart, with a first rate plough, which turns a furrow of eleven inches.

This field with beds on a dead level, and hill-side ditches having a descent of two inches in twelve feet, went through this year of extreme trial without a wash. In some places the water trickled over the beds where the level had become imperfect, especially in the *short rows*, but was soon disposed of in the furrows below, which were more perfect, and thus all damage was prevented.

You will observe that I have described this system of cultivation as adapted to my own lands, and therefore cannot say that *precisely* the same result would be gained in lands of a different quality. But I will venture to say that deep ploughing, combined with this system, will prevent any lands

from washing, unless it is attempted to make corn, cotton, or tobacco for successive years upon the same field, and then the land, losing its cohesiveness, will almost certainly wash under any treatment.

With great esteem,

Your obedient servant,

J. W. NORWOOD.

REPORT

ON THE

WHEAT CROP OF 1857 OF DR. WILLIAM R. HOLT,

OF DAVIDSON.

LEXINGTON, DAVIDSON CO., N. C., October, 1857.

To the Executive Committee of the State Agricultural Society:

I submit a concise statement of the various particulars respecting the cultivation and product of the Lot No. 1 in wheat in 1857, submitted to the Executive Committee of the State Agricultural Society:

LOT No. 1.—At my Trentham place. This plantation was bought in 1828. The lot named had been entirely exhausted and had not been in cultivation for a few years, and constituted a part of a grazing common, and would not have repaid for cultivation as it then was. It consisted of 8 acres and 63 hundredths, and was set apart for a grazing lot, if it could be made to produce clover.

After clearing the land of stones, which were put into underdrains in a low flat part of it, and grubbing up the sassafras, old peach trees, mulberry shrubs, persimmon bushes, &c., it was cultivated in corn and oats to cleanse it and test its remaining powers, with very poor returns. Eventually it was broken up seven inches deep and sowed in oats at the rate of 2 bushels per acre, and they turned under in the milk state the last of June, 1833. Lightly manured all over the next spring, put in corn. The result, a good crop followed, with the next year a good crop of oats and stand of clover from spring seeding. The rotation has been since mainly corn, oats, clover, the latter grazed until within a few years, since I have began the cultivation of wheat. The rotation has been an irregular one, mainly wheat, corn, wheat, clover, clover.

The wheat crop now submitted, followed the last crop of clover in this rotation, and was grazed very close. In August the lot was coultered 15 inches deep, with three horses, 10 inches apart in the furrows, and grazed in the mean time. Followed the last of August and first of September with three horse turning plows to the depth of 8 inches. Harrowed with heavy three horse harrows. The fall season being very dry, and the fallowing being across the coulter furrows, the ground broke up into very large clods upon which the harrows could not have much effect. The clod crusher

(made by R. Sinclair, Sen., of Baltimore,) was then introduced and passed with much effect over the whole and repeated over the cloddiest portions. On the first week of November the wheat and guano was sowed. Two bushels and one-eighth of the former and 250 lbs. of the latter. Plowed in with one horse, sharp, shovel plows, harrowed and then rolled with the clod crusher. The use of the harrow seemed of most effective use in tearing up and bringing to the surface the remaining clods, which were most beautifully reduced by the clod crusher. The field was brought into the most beautifully fine and well pulverised condition and left so until the 10th of last March, when it was sowed in grass seeds, viz: 6 quarts of clover seed and 1 bushel of orchard grass.

The wheat (white etrurian) was cut on the 21st of June, with a three horse reaper, (made by Obed. Hussey, of Baltimore,) and was saved very clean. It could not have been cut with grain cradles without great difficulty and loss. It stood very thick on the ground, and much of it five feet and six inches in height.

The yield, forty-six bushels and sixty-four hundredths per acre, of 60 lbs. to the bushel.

This lot, I omitted to mention, was frequently dressed when in the clover part of the rotation with leached ashes and plaster of Paris, at the rate of 10 bushels per acre of the former to 1 bushel of the latter.

The soil, a deep, heavy, red clay loam. The natural growth on adjoining and similar lands: red and white oak, gum, hickory, dogwood and wild grape vines. The largest yield heretofore on an adjoining lot was 35 bushels per acre without guano.

ESTIMATED COST OF LABOR, SEEDS, MANURES, &C.

Coultering, (3 horses,)	$2 50	per acre.
Plowing, (3 horses,)	2 50	" "
Harrowing, (3 horses,)	40	" "
Clod crushing Roller, (3 horses,)	40	" "
Extra harrow and clod crushing,	10	" "
Seed wheat, 2½ bushels, $1.25,	2 65	" "
Peruvian guano, 250 lbs. per acre,	7 50	" "
Sowing wheat and guano,	20	" "
Shovel plowing,	75	" "
Harrowing,	40	" "
Clod crushing,	40	" "
	$17 80	

Product,	46 64 bushels	
At $1.25,	11 66	
	$58 30	$58 30
Expenses,		17 80

Nett proceeds, ... $40 50 exclusive of interest on land and taxes.

The above lot was broken up into an unparalleled rough and cloddy condition, and I determined to try the capabilities of my implements to bring it into a fine, pulvuritent state, to make, in my view, the guano pay and to secure a good stand of grass for profitable grazing hereafter.

All of which is respectfully submitted.

W. R. HOLT.

[Lot No. 2.]

Lexington, Davidson County, October 1857.

To the Executive Committee
of the North-Carolina State Agricultural Society:

Statement of the cultivation, products, &c., of Lot No. 2 in wheat during the year 1857.

Three-fourths of this lot had been in the cultivation of cotton for 35 years successively, and for the last ten years had been manured with well rotted farm yard manure every 2 or 3 years, and also every 2 or 3 alternate years dressed with leached ashes over the recent planted cotton seed in the drill and on the surface. The general products of cotton in the seed from 8 to 1200 lbs.

In the spring of 1856 it was deeply plowed 7 to 8 inches with three horse plows, harrowed and planted in corn. During the last of October the corn was gathered, the corn stalks cut close to the ground, removed to the barn yard, and wheat, at the rate of 2 bushels of early purple straw, was sown to the acre, with, at the same time, 200 lbs. of Peruvian guano, plowed in with sharp shovel plows and thoroughly harrowed with three horse harrows and cross harrowed. The sowing of the wheat and guano was made the second week of November, and the land in the finest possible tilth.

The wheat was cut with a Hussey wheat reaper, and the yield on the 22.75 acres, 967½ measured bushels of early purple straw, weighing, on Fairbank's balances 65 lbs. to the bushel. At 60 lbs. per bushel the yield is 46.07 bushels per acre.

This lot, No. 2, is at my Linwood farm. The soil is naturally of the best quality of upland, and consists of a deep chocolate clay loam, lies very high and undulating, and is the north end of a field of 40 acres, and was cut off from the field in a regular form, but was the best wheat in the field, as a portion of the remaining was winter killed, from the blowing off the deep snow and wetness of a part of the field.

ESTIMATED COST OF LABOR, SEED, MANURE, &C.

Listing off into 18 feet lands with two horses,	$ 15	per acre.
Sowing wheat and guano,	20	" "
Shovel plowing,	75	" "
Harrowing and cross harrowing, (3 horses,)	80	" "
Seed wheat,	2 65	" "
Peruvian Guano, 200 lbs.,	6 00	" "
	$10 55	

Product, ... 46 07 per acre.
At $1.25, ... 11 51¼

57 58¼ $57 58¼
Expenses, ... 10 55

47 03¼ nett product exclusive of interest on land and taxes.

The charges for the labor of cultivation above made may be considered by some too liberal, but from great experience I consider them about right.

All of which is respectfully submitted by

W. R. HOLT.

NORTH-CAROLINA—*Davidson County*:

I, Azariah Williams, County Surveyor, being sworn, declare, that I have carefully surveyed and measured the following Lots of Land for Dr. William R. Holt, of Davidson county, and that the measurement is correct, viz:

Lot No. 1—At his Trentham place, near Lexington, from which a crop of wheat has been taken the present year, measured Eight Acres and Sixty-three Hundredths, (8.63 acres.)

Lot No. 2—At Linwood, his Jersey Plantation, from which also a crop of wheat has been taken the present year, measured Twenty-two Acres and Seventy-five Hundredths, (22.75 acres.)

AZARIAH WILLIAMS.

Sworn to and subscribed before me, an acting Justice of the Peace for Davidson county, on this the 16th of October, A. D., 1857.

C. L. PAYNE, J. P.

NORTH-CAROLINA—*Davidson County*:

I, William R. Holt, of Lexington, Davidson county, being sworn, say that I took proper care to have the wheat grown on the within Lots, No. 1

and 2, measured by Mr. Williams, the Surveyor, and that I believe the measurement of the wheat, as it was measured and tallied in the presence of myself and son, one or the other during the time, to be correct, as follows:

Lot No. 1—At the Trentham place, consisting of 8 acres and 63 hundredths, measured, full measure, Three Hundred and Sixty-eight (368) Bushels of White Etrurian wheat, weighing 64 lbs. to the bushel, and at the rate per acre, 60 lbs. to the bushel, of Forty-six Bushels and Sixty-four hundredths (46.64) bushels per acre,—measured in a sealed half-bushel.

Lot No. 2—At Linwood, my Jersey Plantation, consisting of Twenty-two Acres and Seventy-five Hundredths, measured under the same circumstances, Nine Hundred and Sixty-seven and a half bushels of early Purple Straw wheat, (967.5 bushels of 65 lbs. to the measured bushel;) at 60 lbs. to the bushel, the measurement to the acre would be Forty-six bushels and Seven Hundredths per acre, (46.07.) The above I believe to be correct and true,—measured in a sealed half-bushel.

W. R. HOLT.

Sworn to and subscribed before me, an acting Justice of the Peace for Davidson county, on this the 16th of October, A. D. 1857.

C. L. PAYNE, J. P.

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NORTH-CAROLINA—*Davidson County:*

I, James M. Holt, witnessed the tallying and measurement of the aforesaid wheat from the lots named in the foregoing paper, and being sworn, say, that I believe the measurement to be correct, as care was taken to have it so.

JAMES M. HOLT.

Sworn to and subscribed before me, an acting Justice of the Peace for Davidson county, October 16th, 1857.

C. L. PAYNE, J. P.

NOTE.—On the foregoing lots of Wheat the Society paid premiums, as follows: Lot No. 1, $40; Lot No. 2, $50.

AWARD OF PREMIUMS

OF THE

NORTH-CAROLINA STATE AGRICULTURAL SOCIETY,

FOR 1857.

Thoroughbred Horses.	
Best Stallion over 4 years old, Ruffin & Albright, Graham, ...	$ 25 00
Second best do., Josiah Turner, Hillsboro', ...	15 00
Best Filly over 2 and under 4 years old, James Turner, Hillsboro',	10 00
Quick Draught and Saddle Horses.	
Best Stallion over 4 years old, Dr. R. K. Speed and J. M. Hinton, Pasquotank, ...	25 00
Second best do., W. Emery, Wake, ...	10 00
Best Stallion over 2 and under 4 years old, T. F. Bailey, Granville,	15 00
Second best do., Wm. March, Davie, ...	8 00
Best Stallion over 1 and under 2 years old, G. T. Cooke, Wake, .	10 00
Best Brood Mare over 4 years old, Dr. Wm. J. Green, Wake, ...	20 00
Second best do., W. D. Jones, Wake, ...	10 00
Best Brood Mare with foal at her foot, L. T. Clayton, Wake, ...	20 00
Best Filly over 2 and under 4 years old, Albert Rankin, Guilford,	10 00
Second best do., Wm. R. Albright, Graham, ...	5 00
Best Saddle Horse, Jno. Hayes, Granville, ...	15 00
Second best do., T. F. Williamson, Caswell, ...	10 00
Best pair matched Carriage Horses, R. S. Tucker, Wake, ...	20 00
Second best do., J. V. Perkins, Pitt, ...	10 00
Best pair do., raised in the State, M. D. C. Bumpass, Person, ...	20 00
Second best pair do., S. O'Bryant, Person, ...	10 00
Best Single Harness Horse, Jno. H. Neal, Beaufort, ...	15 00
Second best do., O. S. Baldwin, Wilmington, ...	10 00
Best do., raised in the State, T. J. Utley, Wake, ...	15 00
Second best do., Jno. W. Wiggins, Wake, ...	10 00

[The Committee on Quick Draught and Saddle Horses call attention to the Pony of W. F. Broadnax, of Rockingham, and recommend him for a discretionary Premium for speed, fine action, and as a well broke horse. They also call attention to a very fine 3 year old Gelding colt, exhibited by Dr. Wm. Green, of Wake, to which they could award no Premium, as none of that class was named in the Premium List.]

Heavy Draught Horses.	
Best Stallion over 4 years old, J. S. Holt, Alamance,	$ 25 00
Second best do., Jefferson Monk, Orange,	10 00
Best do., over 1 and under 2 years old, Wm. Smith, Orange,	5 00
Best Gelding, H. A. Wright, Caswell,	5 00
Jacks, Jennets and Mules.	
Best Jack raised in the State, Wm. Hamlen, Orange,	15 00
Second best pair of Mules over 3 years old, W. D. Jones, Wake,	10 00
Cattle—North Devons.	
Best Bull 4 years old, Dr. W. R. Holt, Davidson,	25 00
Best Bull Calf 2 years old, Dr. W. R. Holt, Davidson,	15 00
Best Cow 4 years old, Walter Gwynn, Wake,	10 00
Best Heifer 2 years old, Dr. W. R. Holt, Davidson,	10 00
Cattle—Durhams, Herefords, Ayrehires, Holsteins and Alderneys.	
Best Durham Bull Calf over 2 and under 3 years old, Crouse & Irvine, Lynchburg, Va.,	15 00
Best do., under 1 year old, Crouse & Irvine, Lynchburg, Va.,	5 00
Best Cow over 3 years old, Crouse & Irvine, Lynchburg, Va.,	10 00
Second best do., Crouse & Irvine, Lynchburg, Va.,	5 00
Best Heifer over 2 and under 3 years old, Crouse & Irvine, Lynchburg, Va.,	10 00
Best do., over 1 and under 2 years old, J. M. Crenshaw, Wake,	10 00
Cattle—Grades and Natives.	
Best Grade Bull over 4 years old, S. H. Dunn, Granville,	25 00
Best Grade Bull Calf under 1 year old, Kemp P. Battle, Wake,	5 00
Best Grade Cow over 3 years old, Kemp P. Battle, Wake,	10 00
Second best do., Crouse & Irvine, Lynchburg, Va.,	5 00
Best Native Cow do., Crouse & Irvine, Lynchburg, Va.,	10 00
Milch Cows.	
Best Milch Cow giving 28 quarts of Milk, Crouse & Irvine, Lynchburg, Va.,	10 00
Second best do., giving 24 quarts of Milk, Crouse & Irvine, Lynchburg, Va.,	5 00
Working Oxen.	
Best Yoke of Oxen, Joel Powers, Wake,	10 00
Second best do., Frederick Goodwin, Wake,	5 00
Fat Cattle.	
Best Fat Cow, Crouse and Irvine, Lynchburg, Va.,	5 00

Sheep.	
Best South Down Buck, Dr. Wm. R. Holt, Davidson, ...	$ 15 00
Swine—Large Breed.	
Best Boar over 2 years old, Dr. F. J. Haywood, Wake, ...	10 00
Best Sow over 2 years old, Sylvester Smith, Wake, ...	5 00
Best Breeding Sow with 7 Pigs, Everard Hall, Wake, ...	10 00
Second best do., Sylvester Smith, Wake, ...	5 00
Best Lot of Pigs under 10 months old, Sylvester Smith, Wake, .	6 00
Best Nobone Barrow 13 months old, M. Cuthrell, Davie, ...	5 00
Swine—Small Breed.	
Best Suffolk Boar, Everard Hall, Wake, ...	10 00
Swine—Grades and Natives.	
Best Native Boar over 2 years old, Rufus H. Jones, Wake, ...	10 00
Best do. over 1 and under 2 years old, R. Fleming, Wake, ...	5 00
Best Native Sow over 2 years old, J. Moss, Wake, ...	5 00
Best Grade Breeding Sow with 6 pigs, J. J. Ferrell, Wake, ...	10 00
[H. C. Ligon, of Wake, exhibited a Grade Boar under one year old, which is deemed worthy of notice, though not falling under the classification for a premium.]	
Poultry.	
Best Trio of Shanghais, Mrs. E. Nixon, Wake, ...	3 00
Best do. Brahma Pootras, Mrs. E. Nixon, Wake, ...	3 00
Best do. Seabright Bantams, Jno. P. Haywood, Wake, ...	3 00
Best do. Game Cocks, J. Moss, Wake, ...	3 00
Best Pair of Domestic Turkeys, R. Fleming, Wake, ...	3 00
Best Pair of Wild Geese, T. H. Selby, Wake, ...	3 00
Best Pair of Muscovy Ducks, S. Smith, Wake, ...	3 00
Best Pair of Common Ducks, Jno. Hutchins, Wake, ...	3 00
Best Pair of Guinea Fowls, Mrs. E. Hall, Wake, ...	3 00
Best and largest collection, owned by the exhibitor, Mrs. E. Nixon, Wake, ...	3 00
Agricultural Productions.	
Best variety of Bread Corn, W. D. Jones, Wake, ...	3 00
Best variety of Stock Corn, Jno. Hutchins, Wake, ...	3 00
Best variety of Wheat, W. D. Jones, Wake, ...	3 00
Best variety of Oats, Jno. Hutchins, Wake, ...	3 00
Best variety of Rye, J. P. Mabry, Davidson, ...	3 00
Best variety of Field Peas, Jno. Hutchins, Wake, ...	3 00
Best variety of Sweet Potatoes, Dr. Thos. Banks, Wake, ...	3 00
Best variety of Irish Potatoes, Jno. Hutchins, Wake, ...	3 00
Best two stalks of Cotton, W. D. Jones, Wake, ...	3 00

Best and greatest variety of the above, raised on one farm, W. D. Jones, Wake,	$ 10 00
Best specimen of Cotton in seed, N. Price, Wake,	5 00
Best specimen of Syrup from Chinese Sugar Cane, R. H. Smith, Halifax,	10 00
Best specimen of Vinegar from Chinese Sugar Cane, Mrs. Geo. Mendenhall, Guilford,	3 00

Tobacco.

Best Lot of Manufactured Chewing Tobacco, Y. & E. P. Jones, Caswell,	10 00
Best Lot of Manufactured Smoking Tobacco, Y. & E. P. Jones, Caswell,	3 00

Salt Provisions.

Best half dozen Hams, N. Price, Wake,	10 00
Best barrel of Herrings, W. H. Putney, Wake,	10 00

Dairy.

Best sample of Fresh Butter, Miss Jane E. Caldwell, Burke, and Mrs. W. B. Williams, Warren, to be divided,	10 00
Second best do., Mrs. Louisa A. Holt, Davidson,	5 00

Food, Condiments, &c.

Best barrel Wheat Flour, J. S. Holt,	10 00
Second best do., H. D. Lott,	5 00
Best specimen Corn Meal, Everard Hall, Wake,	5 00
Best specimen Rye Flour, H. D. Lott,	5 00
Best specimen Buckwheat Flour, Josiah Turner, Orange,	5 00
Best specimen Starch, Needham Price, Wake,	3 00
Best Wheat Bread, Mrs. Dr. R. S. Mason, Wake,	3 00
Second best do., Mitchell and Simpson, Wake,	2 00
Best specimen Strained Honey, Mrs. Jno. P. Mabry, Davidson,	3 00
Second best Honey in the Comb, S. Smith, Wake,	3 00
Best Quince Jelly, J. P. Mabry, Davidson,	3 00
Best Apple Jelly, Mrs. L. A. Holt, Davidson,	3 00
Best Preserved Quinces, J. P. Mabry, Davidson,	3 00
Best Green Pickles, Mrs. Ruffin Tucker, Wake,	3 00
Best Tomato Catsup, Mrs. L. A. Cooke, Wake,	3 00
Best Brandy Peaches, Mrs. R. Tucker, Wake,	3 00
Best Dried Apples, Mrs. R. Tucker, Wake,	3 00

[Mrs. Ruffin Tucker exhibited half a bushel of Filberts grown by her, which were very fine.]

[There were some very delicious Grapes, the Elsingburg and Nobilla, exhibited by A. C. Hege, of Davidson, and a Jar of Scuppernong Grapes by Mrs. J. D. Beatty, of Bladen. The Elsingburg is a new variety with us and is a very superior Grape.]

[There was also a very fine specimen of Sweet Water Grapes, of the second crop, exhibited by Mrs. E. Hall of Wake.]

Native Wines.

Best Dry Catawba, D. M. Lewis, Franklin,	$ 5 00
Second best Dry Catawba, D. M. Lewis, Franklin,	2 00
Best Sparkling Catawba, D. M. Lewis, Franklin,	5 00
Best specimen of Rosin Oil, Alex. Miller, Newberne,	3 00

[An excellent article of Wine made from Blackberries, was exhibited by Mrs. R. H. Smith, of Halifax, Mrs. S. Atkinson, of Wake, and Mrs. L. A. Holt of Davidson, for which there was no premium offered, but the Committee recommend a premium to each of the exhibitors.]

[An article of Nash Apple Brandy, 48 years old, was exhibited by Jno. Tisdale of Nash, for which there was no premium offered. It was decidedly good. A bottle of Blackberry Vinegar which was made for a beverage, exhibited by Mrs. L. A. Holt, of Davidson, was considered by the Committee entitled to a premium, for which there was none offered.]

Fruit and Fruit Trees, adapted to the South.

Best and greatest varieties of Apples, S. W. Westbrooks & Co., Guilford,	10 00
Best and greatest varieties of Grapes, A. C. Hege, Davidson,	10 00
Largest and Best variety of Apple Trees, S. Westbrooks & Co., Guilford,	10 00
Largest and best variety of Peach Trees, S. Westbrooks & Co., Guilford,	10 00
Largest and best variety of Strawberry Vines, S. Westbrooks & Co., Guilford,	2 00
Largest and best variety of Rasberry Vines, S. Westbrooks & Co., Guilford,	2 00

Vegetables.

Best Stalks of Celery, Mrs. R. Tucker, Wake,	2 00
Best Cabbages, Everard Hall, Wake,	2 00
Best Egg Plants, Everard Hall, Wake,	2 00
Best Squashes, Jno. C. Palmer, Wake,	2 00
Best Onions, W. D. Jones, Wake,	2 00
Best Sugar Beets, Mrs. R. Williams, Wake,	2 00
Best Mangel Wartzel Beets, H. Mordecai, Wake,	2 00
Best Carrots, Rev. Dr. R. S. Mason, Wake,	2 00
Best Turnips, Jno. Hutchins, Wake,	2 00
Best Pumpkins, E. H. Overton, Granville,	2 00

[The Committee report that Dr. D. A. Montgomery, of Alamance, had on exhibition three heads of Cabbage, of superior quality, but under the rule requiring not less than six, they could not award him a premium.]

Plows and Harrows.

Best two horse Plow, N. Boyden & Son, Rowan,	$ 5 00
Second Best two horse Plow, J. H. Thompson, Davidson,	4 00
Best horse Plow Manufactured in the State, W. B. Williams, Warren,	5 00
Best single horse Plow, N. Boyden & Son, Rowan,	4 00
Second best single horse Plow, W. B. Williams, Warren,	3 00
Best subsoil Plow, W. B. Williams, Warren,	5 00
Second best subsoil Plow, N. Boyden & Son, Rowan,	4 00
Best Harrow, W. B. Williams, Warren,	5 00
Second best Harrow, J. P. Mabry, Davidson,	2 00
Best Horse corn Planter, Jones & Hooker, Orange,	5 00
Best Smooth Iron Roller, James M. Towles, Wake,	5 00
Best Cultivator for general purposes, N. Boyden & Son, Rowan,	5 00
Second best Cultivator for general purposes, W. B. Williams, Warren,	2 00
Best Corn Cultivator, W. B. Williams, Warren,	5 00
Best Cotton Scraper, N. Price, Wake,	5 00

Thrashing Machines, Fanning Mills, &c.

Best Thrashing Machine, R. Sinclair & Co., Baltimore, Md.,	15 00
Best Fanning Mill, J. Montgomery & Brother, Baltimore, Md.,	10 00
Second best Fanning Mill, R. Sinclair & Co., Baltimore, Md.,	5 00
Best Improved Cone Fan, J. Montgomery & Brother, Baltimore, Md.,	5 00
Best Hay Stalk and Straw Cutter, J. H. Thompson, Davidson,	10 00
Best Hay and Straw Cutter, R. Sinclair & Co., Baltimore, Md.,	10 00
Best Hay and Straw Cutter Manufactured in the State, Clapp Huffman & Co., Guilford,	10 00
Best Hand-power Corn Sheller, R. Sinclair & Co., Baltimore, Md.,	10 00

Reapers and Mowers.

Best Reaping Machine, O. Hussey, Baltimore, Md.,	20 00
Second best Reaping Machine, Jones & Hooker, Orange,	10 00
Best Sweep horse Power, Jones & Hooker, Orange,	20 00
Second best Sweep horse Power, J. H. Gooch, Granville,	10 00
Best Stump Puller, N. Price, Wake,	20 00
Second best Stump Puller, Wm. McKeever, Wake,	10 00

Hay and Cotton Press, &c.

Best Horse Rake, J. M. Towles, Wake,	5 00
Best Washing Machine, Alex. Dickson, Orange,	5 00
Second best Washing Machine, Alex. Dickson, Orange,,	2 00

Carriages and Wagons, &c.

Best open Buggy, B. J. Perkinson, Wake,	15 00
Second best open Buggy, Overman & Wilson, Mecklenburg,	10 00
Best six horse Farm Wagon, N. Price, Wake,	15 00
Best two horse Farm Wagon, Henry Horton, Wake,	8 00

Best horse Cart, W. J. Fort, Wake,	$ 8 00
Second best horse Cart, Henry Horton, Wake,	4 00
Best Buggy Pole and Shafts combined, V. N. Mitchell, Cabarrus,	5 00
Machinery.	
Best Steam Engine 8 horse power, Silas Burns, Wake,	50 00
Best Portable Grist Mill, W. D. Cooke, Wake,	15 00
Best Smut Machine, Alex. Dickson, Orange,	10 00
Watson's $12 Sewing Machine, Jno. H. Davis, Halifax,	15 00
Machine for paring horses Hoofs, V. N. Mitchell, Cabarrus,	5 00
Best Morticing Machine, L. P. Clifford,	5 00
Farm and Domestic Tools.	
Best Churn, J. M. Towles, Wake,	3 00
Best Sausage Cutter, J. M. Towles, Wake,	3 00
Best Grain Cradle, J. M. Towles, Wake,	3 00
Best and largest collection of Agricultural Implements, W. B. Williams, Warren,	25 00
Best and largest Manufactured in the State, N. Boyden & Son, Rowan,	25 00
Cabinet Work.	
Best Bedstead made in North Carolina, R. W. Henry, Wayne,	5 00
Best Rocking Chair, W. F. Shultz, Forsyth,	3 00
Best Centre Table, T. Day, Caswell,	3 00
Best Book Case and Secretary, W. F. Shultz, Forsyth,	5 00
Best Window Sash and Blinds, Door and Palings, Murdoch & Cairns, Rowan,	00 10 00
Shoes, Hats, &c.	
Best half doz. Brogans, Charles M. Lines, Davidson,	3 00
[Henry Porter of Wake, exhibited a case of very handsome Ladies and Gentlemen Shoes and Gaiters of Northern Manufacture, and one pair of excellent Brogans of his own make.]	
[F. R. Blum of Forsyth, exhibited a pair of Gum-bottom Shoes, which were very good, but were entered too late for competition.]	
Sundries.	
Best Lot of Earthen Ware, H. Schaafner, Forsythe,	3 00
Best Side of Harness Leather, A. F. Moses, Wake,	2 00
Best Kip Skin, A. F. Moses, Wake,	5 00
The Magic Ventilator or Self-Fanning Rocking Chair, invented by David Kahnweiler, Wilmington, a Diploma and	10 00
Volcanic Repeating Fire Arms, manufactured by the New-Haven Arms Co., exhibited by W. C. Stanton, New-Haven, Ct., a Diploma and Silver Cup.	
Fine specimens of Water Buckets, manufactured in North-Carolina, G. H. Makepeace, Fayetteville,	5 00
A pair of Needlework Slippers, Peter Plum, Wake,	2 00

Model of a Locomotive, made by Sam, a negro boy 11 years old, Raleigh & Gaston Railroad,	$ 2 00

Mill Fabrics.

Best piece Woolen Jeans, 18 yards, Mrs. Charles Horton, Wake,	5 00
Best do. Linsey for negroes, 23 yards, W. H. & R. S. Tucker, Ag'ts, Wake,	10 00
Best piece Flannel, 30 yards, W. H. & R. S. Tucker, Ag'ts, Wake,	5 00
Best do. Osnaburgs, 31 yards, E. M. Holt, Alamance,	5 00
Best do. Woolen Carpeting, 24 yards, Mrs. McCorkle, Rowan,	10 00
Best do. Sheeting, 31 yards, E. M. Holt, Alamance,	5 00
Best do. Bed Ticking, 31 yards, E. M. Holt, Alamance,	5 00
Best do. Cotton Jeans, 32 yards, E. M. Holt, Alamance,	5 00
Best pair of Blankets, Mrs. Q. Busbee for Mrs. Patterson, Wake,	5 00
Best bale of Cotton Yarns, Johnston Little River Manufacturing Company,	5 00
Best Hair Mattrass, Wm. Watson, Wake,	10 00
Best Shuck and Cotton Mattrass, Wm. Watson, Wake,	5 00

Household Fabrics.

Best Cotton Patchwork Quilt, Mrs. McCorkle, Rowan,	5 00
Second best do., Mrs. Johnson, Alamance,	2 00
Best Raised-work Quilt, Mrs. M. A. Jordan, Person,	5 00
Second best do., Mrs. Ruffin Tucker, Wake,	2 00
Best Knit Counterpane, Mrs. Ruffin Williams, Wake,	5 00
Second best do., Mrs. James F. Taylor, Wake,	2 00
Best pair Yarn Hose, Mrs. A. L. W., Wake,	2 00
Best Foot Mat, Mrs. S. P. Pescud, Wake,	2 00
Best piece of Linen, Mrs. Chas. Horton, Wake,	5 00

Crochet and Raised Worsted Work.

Best Crochet Collar in Spool Cotton, Miss Maria E. Cooke, Wake,	6 00
Second best do., Miss A. M. Herman, Rowan,	3 00
Best specimen Crochet Lace, Miss Maria E. Cooke, Wake,	6 00
Second best do., Mrs. C. M. Grow, Wake,	3 00
Best Crochet-work in Silk with Beads, Mrs. S. G. Waddell, Wake,	6 00
Second best do., Miss Laura ———, Wake,	3 00
Best Set of Table Mats, in Tidy Cotton, Miss Cooper, Granville,	3 00
Second best do., Misses Hattie and Lulie Cooke, Wake,	2 00
Best Tidy, in Tidy Cotton, Mrs. A. L. W., Wake,	3 00
Second best do., Miss A. M. Stewart, Harnett,	2 00
Best Table Cover, Raised Worsted-work, Miss M. E. Mabry, Davidson,	6 00
Second best do., Mrs. E. N. Mills, Granville,	3 00
Best Heavy Rug, do., Mrs. H. B. Bobbitt, Wake,	6 00
Best Chair Cover, do., Miss Sophie Foltz, Forsythe,	3 00
Second best do., Mrs. Kemp P. Battle, Wake,	2 00
Best Ottoman Cover, do., Miss M. E. Mabry, Davidson,	3 00
Second best do., Miss N. E. Powell, Wayne,	2 00

Knitting and Netting.

Best specimen of Knitting in Wool, Miss M. L. Hill, Wake, ...	$ 3 00
Second best do., Mrs. A. L. W., Wake, ...	2 00
Third best do., Mrs. Partridge, Wake, ...	1 00
Best do. in Silk with Beads, Miss Laura ———, Wake, ...	3 00

Fancy Work and Needle Work.

Best Ornamental Shell Work, Mrs. S. B. Pescud, Wake, ...	5 00
Best specimen Wax Flowers, Mrs. Garrett, Guilford, ...	5 00
Best do. Feather Work, Mrs. H. B. Bobbitt, Wake, ...	5 00
Best do. Hair Work, W. F. Shultz, Forsythe, ...	5 00
Second best do., Mrs. C. P. Pennington, Wake, ...	2 00
Best Leather-work Frame, Mrs. L. A. Cooke, Wake, ...	5 00
Best Collar, Needlework, Mrs. G. M. Lea, Alamance, ...	6 00
Second best do., Mrs. S. B. Pescud, Wake, ...	3 00
Best Undersleeves, Miss E. Haddock, Caswell, ...	4 00
Best Handkerchief, Misses A. & E. Kron, Stanly, ...	6 00
Second best do., Miss Patty Young, Franklin, ...	3 00
Best Child's Dress, Mrs. R. G. Lindsey, Guilford, ...	6 00
Second best do., Mrs. Bruce Gwynn, Wake, ...	3 00
Best Lady's Underdress, Miss A. B., Wake, ...	6 00
Best Lady's Underskirt, Mrs. J. V. Cawthorn, Warren, ...	6 00
Second best do., Miss Rebecca Evans, ...	3 00
Best Gentleman's Shirt, Mrs. E. B. B., Wake, ...	6 00
Second best do., Mrs. E. R. Harris, Cabarrus, ...	4 00
Best Boy's Shirt, Mrs. M. P. R., Wake, ...	6 00
Second best do., Mrs. J. V. Cawthorn, Warren, ...	3 00
Best specimen of Plain Sewing, Mrs. Alsa Tucker, Wake, ...	4 00
Second best do., Mrs. F. R. Blum, Forsythe, ...	2 00

Fine Arts.

Best specimens of Ambrotypes, T. J. Havens, Wake, ...	5 00
Best specimens of Photographs, T. J. Havens, Wake, ...	5 00
Improvement in Ambrotypes, O. P. Copeland, Wake, ...	5 00
Best Oil Painting, "Cattle Scene," A. Meinung, Forsythe, ...	10 00
Second best do., "The Sportsman," Miss Trainham, Granville, .	5 00
Best Pencil Drawing, "Head," Miss R. Smith, New Hanover, ..	5 00
Second best do., "Landscapes," Miss Blanche Fentress, Wake, .	3 00
Best Pastel Drawing, "Burning Volcano," T. W. Lienback, Forsythe, ...	5 00
Second best do., "Landscapes," Miss Blanche Fentress, Wake, .	3 00
Best Architectural Drawings, A. B. Hendren, Rowan, ...	5 00
Best Monumental Drafting, W. G. Milligan, New Hanover, ...	3 00

[The Society are indebted to Mrs. Marling, of Raleigh, for several pictures of her late husband, both in Oil and Water Colors, but in giving premiums consider themselves restricted to living competitors.]

Embroidery.	
Best Mantle Embroidered in Silk, Mrs. Ruffin Williams, Wake, .	$ 6 00
Second best do., Mrs. J. V. Cawthorn, Warren, ...	3 00
Best Vest, (Marino Antique,) Embrodered in Silk, Mrs. A. Motz, Davidson, ...	6 00
Second best do., (Merino,) do., ...	3 00
Best Child's Dress, Embrodered in Silk, Miss Emily Howerton, Orange, ...	6 00
Second best do., Mrs. J. V. Cawthorn, Warren, ...	3 00
Best Sack or Spencer, do., Miss Emily Howerton, Orange, ...	6 00
Second best do., Mrs. F. I. Wilson, Wake, ...	3 00
Best Boy's Jacket, Embroidered in Silk, Miss T. P., Wake, ...	6 00
Discretionary Premiums.	
2 Vases, Potichomanie, Mrs. L. A. Cooke, Wake, ...	3 00
Specimen of Diaphanie, W. D. Cooke, Wake, ...	4 00
Specimen of Card Writing, Geo. E. Ketchum, Wake, ...	3 00
Lot of Sewing and Floss Silk, Misses A. & E. Kron, Stanly, ...	6 00
Beadwork, Knitting and Crocheting by Blind Pupils in the North-Carolina Institution for the Deaf and Dumb and Blind, to be divided between those who executed the work, ...	10 00
1 Lawn Dress, made by Rebecca Trull, a Blind pupil, ...	2 00
1 Doll's Dress, made by Mary Burt and N. Dupre, Blind Pupils,	2 00
1 Glass Top Table, Miss D. M. Happoldt, Rowan, ...	4 00
Map of North-Carolina, W. D. Cooke, Wake, ...	6 00
1 Thread Lace Collar, Miss L. A. Partridge, Wake, ...	6 00
Carved Cameos, Dr. Chas. Smallwood, Woodville, ...	6 00
Specimens of Jewelry, manufactured by Chas. I. Stees, Raleigh, a Diploma and	6 00

A Diploma is awarded to Stirn & Rohlfing, of Baltimore, Md., for a very fine Piano exhibited by them.

A Diploma is awarded to P. J. Mahon for Langstroth's Bee Hive, which is considered a very superior hive.

Mr. T. R. Fentress, of Raleigh, exhibited a show case filled with beautiful specimens of Vesting, &c.

Mr. Chas. H. Thompson, Jeweler, Raleigh, exhibited a Pitcher, Waiter, and two Goblets, all solid Silver, elaborately carved.

Mr. Jno. C. Palmer, Jeweler, Raleigh, exhibited a case of beautiful Jewelry, of Gold and Silver.

Messrs. Williams & Haywood, Druggists, Raleigh, exhibited a case of very fine Perfumery, &c., &c.

W. D. COOKE,

Secretary of the Executive Committee.

CONSTITUTION AND BY-LAWS

OF THE

STATE AGRICULTURAL SOCIETY OF NORTH-CAROLINA.

CONSTITUTION.

WHEREAS, We, a portion of the Farmers of North-Carolina, feeling a deep interest in our profession, are desirous to do everything in our power to promote and elevate its character: *Therefore*, we have associated ourselves into a body for the purpose of affording mutual instruction, arousing a proper spirit of State pride, and a disposition to excel among farmers generally.

ARTICLE 1st. *Resolved*, That this Association shall be called The North-Carolina State Agricultural Society.

ART. 2nd. That for the good government of this Society, there shall be elected the following officers: A President, four Vice Presidents, a Recording Secretary, a Corresponding Secretary, and a Treasurer.

ART. 3rd. That it shall be the duty of the President to preside over the meetings of the Society, to place before it all questions for action; and whenever there be a tie among the members in voting on any question, he shall give the casting vote.

ART. 4th. It shall be the duty of the Vice-Presidents to aid and assist the President in the discharge of his duty, whenever necessity requires, and in the absence of the President the Senior Vice President in attendance shall discharge all duties devolving on the President.

ART. 5th. That it shall be the duty of the Recording Secretary, to call the roll at the opening of the meeting, to read all motions placed before the Society, to keep a correct account of the proceedings of the same, and to discharge all other duties properly belonging to the office.

ART. 6th. That it shall be the duty of the Treasurer to receive all funds belonging to the Society and pay all claims upon the same, when properly authenticated; and that upon entering upon the duties of his office, he shall be required to give Bond with surety, for the faithful performance of his duty.

ART. 7th. That the officers above named, shall be elected annually on Monday night, of the week in which the Fair is held, and shall be voted for by ballot, beginning with the President, and continuing the election in regular rotation.

Art. 8th. That the regular meeting of the Society shall be held annually, on the 18th day of October, in Raleigh.

Art. 9th. That twenty-five members shall constitute a quorum for the transaction of business before the Society.

BY-LAWS.

1st. *Resolved*, That each member, upon joining the Society, shall pay the sum of two dollars, and shall be subject to an annual tax of the same amount. And by the payment of twenty dollars, any person may become member for life, and shall be furnished with an appropriate badge that will entitle him and the ladies of his family to free admission in the Fair Grounds.

2nd. That the admission fees of life members shall be set apart as a permanent fund, to be invested in some profitable Stocks, or otherwise put at interest as the Treasurer may deem best, or the Society may direct. And the Treasurer is required in his annual report to make a separate statement, showing the amount of the aforesaid fund, and the way in which it is invested.

3rd. That it shall be the duty of each member to report to the Society the result of any experiment made by him, which may tend to the advancement of Agriculture.

4th. That it shall be the duty of the President to appoint a committee of three to procure a speaker to deliver an annual address upon some agricultural subject.

5th. That there shall be an annual State Agricultural Fair, in or near the city of Raleigh, to begin on the 3rd Monday of October, where an exhibition of the best specimens in the various branches of industry may be made.

6th. That it shall be the duty of the President to appoint annually a committee of ten, to be styled the Executive committee, (of which the President of the Society shall be ex-officio Chairman, and five of whom shall constitute a quorum,) whose duty it shall be to make all necessary preparations for holding the State Agricultural Fairs, to appoint a Secretary to their body, with such compensation as they may deem necessary, and to cause a journal of their proceedings to be kept, which shall be submitted to the Society at its annual meetings in October.

7th. *And further*, That in future the members of the Executive committee, who come to Raleigh to attend on the business of said committee, be paid their necessary travelling and Hotel expenses, and the Treasurer is hereby authorized to cash their accounts, upon demand, when duly authenticated.

8th. *Resolved*, That hereafter the legislative powers of the Society be committed to the Executive Committee; the said committee reporting all their acts to the first general meeting of the Society, and such proceedings

shall stand as laws of the same unless then otherwise ordered: *Provided nevertheless*, That nothing in this resolution contained shall be so construed as to deprive the Society of the power of originating legislation.

9th. That it shall be the duty of the President to appoint one Chief-Marshal and five assistants, who shall appear on horse-back, with a proper emblem of their office, to see that proper order is maintained.

10th. That it shall be the duty of the Corresponding Secretary to report annually all the information he may obtain in discharging the duties of his office.

11th. That it shall be the duty of the Treasurer to make a report, at the expiration of his term of office, of all moneys received and expended by him, for the society.

12th. That a majority of the members of the Society shall have the power, at any one of the regular meetings, to amend or alter the Constitution and By-Laws of said Society.

AN ACT TO INCORPORATE THE NORTH-CAROLINA STATE AGRICULTURAL SOCIETY.

SECTION 1. *Be it enacted by the General Assembly of the State of North-Carolina, and it is hereby enacted by the authority of the same*, That the State Agricultural Society of North-Carolina be and the same is hereby incorporated into a body politic and corporate, and in that name may sue and be sued, have and exercise any and all the powers and rights of other corporations in this State, may pass all such by-laws, rules and regulations as they may regard as necessary for the purposes of this incorporation, may take and hold real and personal estate not exceeding fifty thousand dollars worth of real estate, may acquire the same by deed, devise, or in any other mode, and may use the same only for the purposes hereinafter specified.

SEC. 2. *Be it further enacted*, That the said society shall annually elect a President, four Vice-Presidents, Treasurer, Recording Secretary, Corresponding Secretary, and such other officers as the society may from time to time find necessary, all of whom shall hold their offices until successors are appointed.

SEC. 3. *Be it further enacted*, That the North-Carolina Agricultural Society, as organized by a voluntary association on the 8th of October, 1852, at Raleigh, be and the same is hereby incorporated, and the rules and by-laws adopted by said association, and the election of officers made by them, shall be and continue in force until the same are altered or superseded by the corporation hereby created; and that the North-Carolina State Agricultural Society herein incorporated shall succeed to all the rights and privileges of said society.

[Ratified December 27, 1852.]